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BRIDGES

by DAVID B. STEINMAN
CONSULTING ENGINEER

REPRINTED FROM
SCIENTIFIC
AMERICAN
NOVEMBER 1954

X-TG 140
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PROFESSIONAL ENGINEER

"The Voice of the Engineer"

★

Published Four Times a Year at Mount Morris, Illinois

The American Association of Engineers

8 South Michigan Avenue, Chicago 3, Ill.

Volume 40 June 30, 1955 Number 2

Dr. Steinman, Life Member of A.A.E., Heads Academy of Sciences

Dr. D. B. Steinman, internationally eminent bridge engineer and scientist, was elected President of the New York Academy of Sciences at the Annual Dinner of the Academy on December 4th. He succeeds Dr. George B. Pegram, distinguished scientist and Dean of the Graduate Faculties of Columbia University.

Dr. Steinman is a Life Fellow of the Academy and was one of the founders of its Section on Mathematics and Engineering. He is a Past President of the National Society of Professional Engineers, National Council of State Boards of Engineering Examiners, U. S. Council of the International Association of Bridge and Structural Engineering, American Association of Engineers, Structural Division of the American Society of Civil Engineers, American Bridge, Tunnel and Turnpike Association, New York State Society of Professional Engineers, Metropolitan Section of the American Society of Civil Engineers, and other professional organizations. He has designed and built over 300 bridges on five continents, and six of his bridges have been honored in the Annual Artistic Bridge awards for the most beautiful bridges in America.

Dr. Steinman is the author of a number of well-known books on bridge engineering in addition to hundreds of scientific, mathematical, and technical papers and publications. He has twice received the Norman Medal, the highest award of the American Society of Civil Engineers. For his scientific and professional contributions and achievements he has received numerous honors and awards from engineering and scientific bodies in this country and abroad, and a number of decorations and honors from foreign countries.

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BULLETIN DE L'ASSOCIATION INTERNATIONALE DES PONTS ET CHARPENTES
MITTEILUNGEN DER INTERN. VEREINIGUNG FÜR BRÜCKENBAU & HOCHBAU
BULLETIN OF THE INTERNATIONAL ASSOCIATION FOR BRIDGE AND
No. 14 STRUCTURAL ENGINEERING No. 14

30 Juillet 1955 30. Juli 1955 July 30, 1955

The Mackinac Bridge, Michigan (USA)

Ce pont-route a une longueur de 8100 m. Il comporte deux approches admettant chacune 30 travées et une partie médiane à 3 travées.

La partie médiane constitue un pont suspendu de 2580 m de longueur, la portée entre les deux pylônes étant de 1150 m. Le tablier à 4 pistes a une largeur de 14,6 m. Les pylônes de 168 m de hauteur sont en acier. Les piles ont dû être enfoncées parfois jusqu'à 60 m au-dessous du niveau de l'eau. Les travaux ont commencé en juillet 1954 et doivent être terminés en novembre 1957. Le poids de l'ensemble de l'ouvrage doit être de 66 500 tonnes d'acier (câbles, tablier, pylônes); le volume de béton atteindra 335 000 m³ (fondations, blocs d'ancrage, piles et appuis). Les frais de construction sont estimés à 99 800 000 dollars.

Les investigations géotechniques ont révelé un sol de fondation rocheux, admettant une capacité de charge de 65 kg/cm², ce qui correspond à une sécurité de quatre fois. Pour tenir compte du charriage des glaçons, il a été nécessaire de protéger les piles avec des plaques d'acier. Les deux câbles porteurs travaillent à une traction de 30 000 tonnes. On a admis pour la pression du vent 250 kg/m². Le treillis de renforcement a une hauteur de 11,5 m.

D'après ses calculs aérodynamiques et les essais en soufflerie, l'auteur estime avoir réalisé sur cet ouvrage la plus grande sécurité possible.

Diese Straßenbrücke ist 8100 m lang und besteht aus den beiden Zufahrtsbauwerken mit zusammen 30 Feldern und dem 3-feldrigen Mittelstück.

Dieser Mittelteil ist eine Hängebrücke von 2580 m Länge, wobei die Spannweite zwischen den beiden Türmen 1150 m beträgt. Die 4-spurige Fahrbahn ist 14,6 m breit. Die 168 m hohen Türme sind aus Stahl. Die Pfeiler mußten teilweise bis auf 60 m Tiefe unter dem Wasserspiegel fundiert werden. Die Arbeiten wurden im Juli 1954 begonnen und sollen bis zum November 1957 beendet sein. Das ganze Bauwerk soll 66 500 t Stahl (Kabel, Fahrbahnkonstruktion, Türme) und 335 000 m³ Beton (Fundamente, Verankerungsblöcke, Pfeiler und Widerlager) enthalten. Die Baukosten wurden auf 99 800 000 Dollars geschätzt.

Die geotechnischen Untersuchungen ergaben für den felsigen Untergrund eine Tragfähigkeit von 65 kg/cm², was einer 4-fachen Sicherheit entspricht. Mit Rücksicht auf den Eisgang sollen die Pfeiler mit Stahlplatten gestützt werden. Die beiden Tragkabel werden auf 30 000 t Zug beansprucht. Als Winddruck wurden 250 kg/m² angenommen. Das Versteifungsfachwerk ist 11,5 m hoch.

Der Verfasser glaubt, auf Grund seiner aeroydnamischen Berechnungen und Versuche im Windkanal eine größtmögliche Sicherheit für dieses Bauwerk erreicht zu haben.

This road bridge is five miles long and consists of the two approach sections, of altogether 30 spans, and the 3-span centre section.

This centre section is a suspension bridge 8,614 ft. long, with a span of 3,800 ft. between the two towers. The 4-lane carriageway is 48 ft. wide. The 550 ft. high towers are of steel. The piers had in some places to be founded at a depth of 200 ft. below the water level. Work was begun in July 1954 and should be completed by November 1957. The complete structure will require 66,500 tons of steel (cables, deck structure and towers) and 440,000 cu. yds. of concrete (foundations, anchor blocks, piers and abutments). The estimated total coat is 99.8 million dollars.

The geotechnical investigations gave a bearing capacity for the foundation rock of 60 tons per sq. ft., with a factor of safety of 4. In consideration of ice conditions, the piers will be protected by steel plates. The two suspension cables have a combined loading of 30,000 tons. The wind pressure was taken as 50 lb/sq. ft. The stiffening trusses are 38 ft. deep.

The author considers, on the basis of his aerodynamic calculations and wind tunnel experiments that the greatest possible safety has been achieved in this structure.

D. B. STEINMAN, Consulting Engineer, New York, N. Y.

Suspension Bridges. The Aerodynamic Problem and Its Solution

Les problèmes aérodynamiques du pont suspendu et leurs solutions

Die aerodynamischen Probleme und ihre Lösungen bei Hängebrücken

X-TG140
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New Underwater Concreting Records Set at Mackinac Bridge

Mortar intrusion technique employed in placing over 22,000 cubic yards of pier concrete in 5-day period.

Reprinted from the September, 1955, issue of
ROADS AND STREETS

X-TG140
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#5
In Oversize
Box 30

EXTRAIT DU *GÉNIE CIVIL*
du 15 Juin 1955

LE VIADUC
SUR LE DÉTROIT DE MACKINAC
entre le lac Michigan et le lac Huron
(ÉTATS-UNIS)

par

D. B. STEINMAN,
Ingénieur-conseil, New-York.

DADIC

X-TG140
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High Aerodynamic Stability For Mackinac Bridge

Wind tunnel tests on a model of the Mackinac suspension bridge in the University of Washington laboratories have upheld the views of the designer, D. B. Steinman, consulting engineer of New York, that the structure will have unusually high aerodynamic stability. The tests indicate that the bridge will have complete stability against all modes of oscilation (vertical, torsional and coupled) at all wind velocities and all angles of attack.

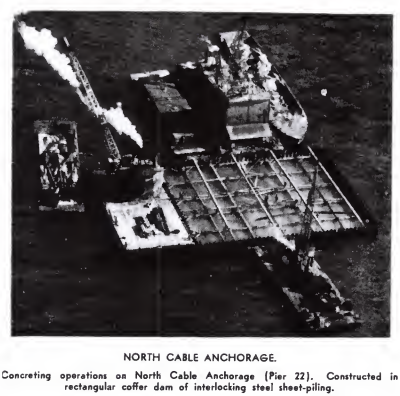
The outstanding feature of the design is the provision of 10 ft wide, open spaces between the stiffening trusses and outer edges of the roadway; the bridge trusses are spaced 68 ft apart and the roadway is only 48 ft wide. The design also provides the equivalent of an opening along the centerline of the bridge, since the two outer lanes are solid, while the two inner lanes and the center mall have an open grid construction. Maximum torsional stability has been achieved by providing two systems of lateral bracing, located in the planes of the top and bottom chords of the truss, a feature recently added to the Golden Gate Bridge in San Francisco.

The model was also tested with all openings in the deck closed as if by ice, and even under these conditions its aerodynamic stability was maintained.

Prof. F. B. Farquharson, director of the laboratory at the University of Washington, conducted the tests.

ENGINEERING NEWS-RECORD

Vol. 155, No. 11 September 15, 1955



NORTH CABLE ANCHORAGE.

Concreting operations on North Cable Anchorage (Pier 22). Constructed in rectangular coffer dam of interlocking steel sheet-piling.

and the lines of waiting cars have extended along the highway as far back as 20 miles from the ferry. Parking fields are provided for the waiting cars, and the occupants find overnight accommodation to resume their place in line in the morning.

Photographs, stereo views, and movies of these traffic conditions at the Mackinac ferries were used to convince bankers and investors before the bridge bonds were sold.

The proposed toll rates on the bridge will average 10 per cent. higher than the present rates on the ferries; the time-saving will be the governing advantage to the motorists. At an average toll rate of $3.08 per vehicle ($2.10 for a passenger auto., more for trucks), the estimated traffic of 2,000,000 cars and trucks in 1958 will yield a revenue of over $6,000,000 in the first year of operation, with progressive increases thereafter. According to the traffic experts, the bridge will pay for itself in 18 years (retiring all bonds), and can then be made toll-free.

From Dream to Reality.

Since 1920 there had been several bridge and tunnel projects. In 1950 the present Mackinac Bridge Authority was created by the Michigan State Legislature. The Authority promptly appointed a Board of Consulting Engineers: O. H. Ammann, G. B. Woodruff, and the writer. In 1951 the three-man Board of Consultants reported that construction of the bridge is feasible. The traffic-engineering firm of Coverdale and Colpitts was retained to make the survey of traffic and prospective revenue.

In January, 1953, the Authority selected the writer to design and supervise the construction of the bridge, and the writer engaged Glenn B. Woodruff as his Associate Consultant. **Within two months,** in March, 1953, preliminary contract plans and estimates of quantities were ready and the substructure and superstructure contracts were negotiated and awarded for prompt commencement of construction as soon as the bonds could be sold. All plans were rushed to get construction started in the spring of 1953.

Bonds Sold.

Two attempts to sell the bonds were made in April and June, 1953, but the bond market was unfavourable. A new syndicate of investment bankers was formed and, in December, 1953, this group of bankers purchased the $99.8 million of bonds to finance the project, at interest rates of four per cent. for $79.8 million of first-lien bonds and 5½ per cent. for $20 million of second-lien bonds.

On January 18, 1954, the $79.8 million of first-lien bonds were offered by the banking syndicate and sold to the bond houses and investing public in one day. The second-lien bonds were not offered to the public but were held by the underwriters for their own accounts.

Through the spring of 1954 the contractors proceeded to order materials and to mobilize equipment. During the next few months, $5 million of floating construction equipment was assembled and in place along the line of the bridge for the substructure contract, said to be the largest and finest floating equipment ever assembled for a construction contract.

On July 10, actual excavation was commenced for the subaqueous foundations. Over 700 men were engaged on the work at the site, working 20 to 24 hours a day. It was a race against time and a battle against the elements. The winter ice conditions at the Straits limit the normal working season to eight months. Word went down the line, from the president of the Merritt-Chapman & Scott Corporation to every man in the organization, to spare no effort or expense to meet the engineer's schedule and to get all the suspension bridge piers and anchorages down to rock before the freezing of the Straits. To make up for time lost by impossible weather conditions, the men continued working in the rough water of the Straits through the winter cold, snow, and storms until freezing of the Straits finally forced the work to stop on January 14, 1955; but the two main-span piers were safely down into the bed rock under the Straits, and the side-span piers and anchorages were already completed as scheduled.

An Ultra-Safe Bridge.

Because of the unusual brecciated formation, people said that the rock underlying the Straits could not support the weight of the bridge. To resolve any doubts, outstanding geologists and soil-mechanics authorities were retained. Exhaustive geological studies, laboratory compression tests, and "in-place" load tests on the rock under water at the site established, without a doubt, that the rock under the Straits can safely support more than 60 tons per square foot. This is four or more times as great as the greatest possible load that will be imposed on the rock by the structure, including the combination of dead load, live load, wind load and ice pressure. The foundations were proportioned to keep the maximum possible resultant pressure below 15 tons per square foot on the underlying rock.

Because the public had been alarmed by the unscientific claims that no structure could withstand the ice pressure at the Straits, we added a further generous margin of ultra-safety. According to the most recent engineering literature on the subject, the maximum ice pressure ever obtained in the field is 21,000 pounds per lineal foot of pier width, and the greatest ice pressure producible in the laboratory under

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WILLIAM PROCTER PRIZE FOR SCIENTIFIC ACHIEVEMENT

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Wisconsin Poetry Magazine

Founded 1954

Vol. 3 September - October, 1957 No. 1

PRIZE AWARDS FOR VOLUME II

Prize Awards for No. 6 — VOL. 2

The awards for Vol. II, No. 6, judged by vote of membership were given to Margaret Buxton, Mark Van Doren, David B. Steinman, Alfred Leland Mooney, Frederika Blankner, Helen Frith Stickney, Alice Phelps Rider, Virginia Chapin and Barbara Lee Newman.

Six judges were chosen to decide the awards for VOL. II as a whole. The winners are as follows: The Oil Painting by Leander Leitner was given to Beulah Jackson Charmley. Two paintings by Rockwell H. Schaefer went to Dr. David B. Steinman. There was a tie for the twenty-five dollar award. This was divided between Jean Starr Untermeyer and Margaret Widdemer. The ten dollar award went to Edward Davison. The Prof. Knosker award of ten dollars was given to Gordon Gilsdorf, the ten dollar Princess Matchabelli Award to Mary Boyd Wagner and the ten dollar Emma Mills Award to Ted Lovington. Two five dollar awards went to Laura Benet and to Ailce Phelps Rider. The awards went to Laura Benet and to Alice Phelps Rider. The ten dollar Dorothy Quick Award went to James Reynolds.

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IL MATTINO

LUNEDI' 4 NOVEMBRE 1957

IL PONTE SULLO STRETTO

Siamo ostili ai versi. Siamo diffidenti degli ingegneri che producono versi. Siamo perplessi dinanzi al progetto di un ponte sospeso sullo Stretto di Messina.

Eppure, pubblichiamo i seguenti versi, composti da un ingegnere, e dedicati precisamente alla visione del ponte sullo Stretto:

Alto sopra lo stretto,
Ogni timor sparito,
Nello splendor torreggia
Il grande ponte ardito;
E questa luce appare
Qual fulgida speranza
Ai secoli futuri
D'umana fratellanza.

Perchè questa eccezione? Perchè questi versi sono stati composti precisamente dall'ingegnere che ha progettato il ponte, — D. B. Steinman — e ci pervengono dal suo studio, sito in 117 Liberty Street New York 6, N. Y., USA.

E adesso i compositori di versi nostrani sono avvertiti; se vogliono che l'eccezione si ripeta, devono prendere la laurea in ingegneria, progettare un altro ponte su qualche Stretto, e spedirci il loro prodotto poetico da New York.

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AMERICAN WEAVE
A Magazine of Poetry for Enjoyment
Edited by Loring Williams and Alice Crane Williams

SUMMER—1957

I INTENDED A SONNET
(*With a bow to Austin Dobson*)

I INTENDED a sonnet
and it turned to a triolet:
when I started upon it
I intended a sonnet,
but I saw your new bonnet
with ribbons of violet;
I intended a sonnet
and it turned to a triolet.

D. B. Steinman

A S P E T T I L E T T E R A R I
L U C A N I A D' O G G I

Novembre - Dicembre 1957

Per l'America

THE ICE CREAM VENDOR OF SORRENTO

I was strolling to buy a memento
On the sun-dazzling beach of Sorrento,
By the blue Neapolitan sea,
When the sweet strains of *Santa Lucia*
Drew my eyes to a *gelateria*
On the rocks near the ferryboat quay.

IL GELATAIO DI SORRENTO

Bighellonavo per comprare un ricordo
Lungo l'abbacinante spiaggia di Sorrento,
Sull'azzurro mare di Napoli,
Quando le note soavi di Santa Lucia
Richiamarono il mio sguardo a una gelateria
Sugli scogli presso al molo del vaporetto.

At the flower-draped booth the young vendor,
In accents appealing and tender,
Entrated the folks passing by:
« Get some ice cream, *signore, signori,* »
Until twilight on red wings of glory
Overspread the cerulean sky.

Dal chiosco infiorato il gelataio giovinetto,
Con accenti teneri e allettanti,
Invitava i passanti:
« Gelati ! Signore, Signori, gelati! »
Finchè il crepuscolo su rosse ali di gloria
Si diffuse nel cielo turchino.

But the strollers went by without heeding
The desperate note of his pleading
And the lure of the gramophone's tune;
When the gold of the sunset departed,
The youth stood alone, broken-hearted,
In the sadly-sweet light of the moon.

Ma la gente passava senza curarsi
Della nota disperata del suo invito
E della melodia allettante del grammofono.
Quando l'oro del tramonto scomparve
Il giovane rimase solo, col cuore spezzato,
Nella soave tristezza della luce lunare.

D. B. Steinman

117 Liberty St.
New York 6, N.Y.

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eninsula

POETS

A MATHEMATICIAN'S ADVICE TO A YOUNG LADY

I

Take a number, just for fun,
Draw a line and marry one.
Now your adding has begun,
Multiply and carry one.

II

Avoid long division, repair it:
Just make up the difference and square it.

III

Extract the root of every trouble;
Divide your joys and they will double.

IV

A pair is greater than its parts;
One love is better than seven.
A line that joins two loving hearts
Is the shortest distance to heaven.

—D.B. Steinman

Poetry Society
of Michigan
SUMMER 1957

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DECEMBER
1957

CHRISTMAS SYMPHONY

On Christmas eve I crossed a bridge
That links two lands in amity.
No barrier stands across the span;
Instead my heart rejoiced to see
A portal arch of balsam boughs
To spell once more, in soft blue light,
The ageless words of peace and hope
That shepherds heard one starry night.

Afar I heard the church bells ring
And saw the twinkling light aglow;
A peaceful gladness filled the air
As on that night of long ago;
And now, to join the symphony,
The span and towers, soaring high,
Are like a star-strung frame of song,
A gleaming harp against the sky.

Both dreams of man invoke the stars:
The bridge of faith, the prayerful spire;
Both give their anthems to the world,
To ring out with the heavenly choir;
And as their music thrills my soul,
I hear the angel-song again,
The blessed tidings of great joy:
"Peace on earth, good will to men."

DAVID B. STEINMAN, *New York Alpha '06*

The

BENT OF TAU BETA PI

Reprinted from JOURNAL OF THE FRANKLIN INSTITUTE,
Vol. 264, No. 6, December, 1957
Printed in U. S. A

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MEDAL DAY PROCEEDINGS AT THE FRANKLIN INSTITUTE

October 16, 1957

PRESENTATION OF THE LOUIS E. LEVY MEDAL
(Founded in 1923)

This Medal is awarded to the author of a paper of especial merit, published in the JOURNAL OF THE FRANKLIN INSTITUTE, preference being given to one describing the author's experimental and theoretical researches in a subject of fundamental importance.

To David Barnard Steinman, Consulting Engineer, New York, New York.

DR. ROLPH: "The Chair recognizes Dr. Joseph S. Hepburn."

DR. HEPBURN: "Mr. President, I present David Barnard Steinman for an award.

DAVID BARNARD STEINMAN

"In his excellent paper on the design of the Mackinac Bridge for aerodynamic stability, Dr. Steinman has made a concise and comprehensive presentation of the engineering principles involved in his design of this suspension bridge.

"The outstanding original feature contributing to aerodynamic stability is the provision of wide open spaces between the stiffening trusses and the outer edges of the roadway. An additional factor for such stability is longitudinal open spaces in the bridge floor between the roadways.

"The contribution of these features to such stability was confirmed by wind tunnel tests on scale models. Previous suspension bridges have had critical wind velocities ranging from 30 to 80 miles per hour. The Mackinac Bridge as designed has no critical wind velocity.

"I present David Barnard Steinman, of New York, as a candidate for the Louis E. Levy Medal, 'In recognition of his outstanding paper, "The Design of the Mackinac Bridge for Aerodynamic Stability," appearing in the December, 1956 issue of the JOURNAL OF THE FRANKLIN INSTITUTE.' "

DR. ROLPH: "Dr. Steinman, by the same authority, I present to you this Louis E. Levy Medal and the Certificate and Report which accompany it."

X-TG-19
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From Vision To Achievement

By DAVID BARNARD STEINMAN, Nat Hon, LL.D., L.H.D., Litt.D., Eng.D., Sc.D. Consulting Engineer

Brother Steinman

EVERY MAN'S PHILOSOPHY of life is the product of his experiences. This is especially true of the professional man. His faith, his dedication, and his devotion to his profession are the products of the experiences that have shaped his life.

To me, engineering has been a succession of inspiring influences, of impelling ambitions, of obstacles overcome, and of dreams come true. The realization — one after another — of dreams that seemed hopeless leaves me reverent and humble.

I am proud to belong to a truly great profession — the profession of planners and builders.

The engineer is a builder. He builds his dreams and the dreams of his fellowmen into enduring realities. He harnesses God's magic for building man's dreams. He overcomes obstacles, breaks down barriers, and builds the bridge for the onward march of Civilization.

Our one lesson from past experience is never to underestimate the future of engineering progress. Each new discovery opens tremendous vistas of further invention and application. The quickening tempo is logarithmic. Each new generation, building on the past, sees more progress in science and engineering than was recorded in all the preceding centuries.

Before the dawn of history, the greatest engineering achievement was the invention and application of the wheel. This was man's first great improvement upon nature. The prehistoric genius who hit upon this apparently simple invention could not have visualized the vast future significance, the amazing vistas of mechanical progress thereby made possible. Hardly any subsequent engineering advance would have been possible without the wheel in its manifold developments, symbolized by all the indispensable wheels of industry, transportation, and power. One invention led to millions of others. If all the wheels used, consciously or unconsciously, in our daily lives were suddenly annihilated, our civilization would collapse.

Despite occasional myopic prophets who discounted further progress, engineering achievement has advanced at an ever accelerating tempo.

In 1837, a distinguished British scientist, with the odd name of Dionysius Lardner, published a scientific paper in which he proved, with irrefutable mathematical equations nobody could question, that it was impossible to build a steamship capable of a nonstop voyage from England to America. A few months later, on April 24, 1838, the steamer *Sirius* arrived in New York, the first to cross the Atlantic entirely under steam. The ship brought to America copies of Lardner's paper "proving" that such voyage was impossible!

In 1843, Henry L. Ellsworth, U. S. Commissioner of Patents, wrote in his Annual Report to Congress:

> *"The advancement of the arts, from year to year, taxes our credulity and seems to presage the arrival of that period when human improvement must end."*

If the Commissioner had been a mathematician, he would have known the elementary fact that an expanding series can never be convergent; it can never approach a limit, but must continue to expand to infinity.

In 1902, Simon Newcomb, the distinguished American mathematician, published a paper in which he proved mathematically that mechanical flight, of a machine heavier than air and capable of carrying a man, was physically impossible. The following year, on December 17, 1903, two bicycle mechanics, the Wright brothers, made their epoch-making flight at Kitty Hawk in North Carolina — the first flight by man in a machine heavier than air. That is the way progress is made — by defying the impossible!

With their crude box-kite, made of wire, wood and fabric, and propeller-driven by a small motorcycle engine, Orville and Wilbur Wright ushered in the age of flight, leading to the present gigantic and powerful multi-engined planes and ultrasonic jet planes, and an unlimited future of rockets, artificial satellites, and space-travel.

This picture of human progress is sketched in some lines I have written, under the caption *"Ad Astra."*

When man first flung a log astride a stream,
He leapt millenniums beyond his birth;
Now strands of steel translate his lofty dream
To link the farthest corners of the earth;
He tames the sea, and ventures forth to sail
The very skies in globe-encircling flight;
His jets and rockets blaze a fiery trail
And ring the universe with lanes of light.
Unsated still, though master now of space,
Man strives (as strive he must) to conquer time;
Some inner force impels him on, to trace
Beyond the stars a destiny sublime.
With light of faith to set his spirit free
Man builds a bridge to span eternity.

In 1912, when I was a young Professor of Civil Engineering at the University of Idaho and had just published a book on *"Suspension Bridges and Cantilevers,"* I was in correspondence with Gustav Lindenthal, who was then the dean of American bridge engineers. I confided to him my ambition to specialize in long-span bridges; he replied in a discouraging vein, declaring that no more long-span bridges would be built; the high price of steel, he said, had made them prohibitive. (The price of steel, erected, had gone up from 2½ cents to 3 cents a pound!) Two years later, in 1914, Lindenthal called me to New York to be his Special Assistant on the design and construction of two new record-breaking bridges, the Hell Gate Bridge at New York (the world's largest and heaviest arch span) and the Sciotoville Bridge over the Ohio River (the world's greatest and longest continuous truss bridge). Never underestimate the future of engineering!

It took forty years (from 1889 to 1929) to increase the world's record span length by only 150 feet, from the Forth Bridge in Scotland with 1,700-foot span to the Detroit-Ambassador Bridge of 1,850-foot span. In the next *eight* years, in two bold jumps, the world's record span-length was *more than doubled*, with the George Washington Bridge (1931) of 3,500-foot span and the Golden Gate Bridge (1937) of 4,200-foot span.

In the ten years from 1930 to 1940 there was more progress in bridge engineering than in all the centuries preceding. This included new bridge types, new record-breaking span-lengths, new materials, improved methods of analysis, and new erection methods. We are now working on bridge projects with unprecedented span-lengths of 5,000 to 6,300 feet, and bridge engineers now agree that span-lengths of 10,000 feet are well within the range of practical feasibility.

On November 7, 1940, the world was shocked and the engineering profession was startled by the aerodynamic destruction of the Tacoma Narrows Bridge, of 2,800-foot span, in a mild

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Editor's Note—Because of the many inspired requests at the Convention for Brother Steinman's after dinner comments they are reproduced here in full.

X-TQ140
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POETRY LONDON - NEW YORK

VOL. 1, No. 3 WINTER, 1957

HART CRANE AND THE BRIDGE

He felt the spell of it—the span that arched
Above the harbor-traffic and its sounds.
For his growing fever to create
A spelled out order from the city's maze.
He found the vision and the symbol here,
The bridge's arc that a man had made
To tilt the sky above the city's tides.

Spirits and echoes still lingered there—
Within the house, that very room, within whose walls
Another man in torment had lived
And made his bid for immortality.
From this same attic on the Brooklyn shore,
Through years of pain and loneliness,
The stricken builder of the Bridge had watched
His dream take shape in shining stone and steel.

With a quickened pulse his flight was launched,
Of cities and the open road he sang;
Of iron rails, workers in the fields,
Of boyhood memories, of lake and star
Of rough South Street and the sailor's chants,
Of Istanbul, sunken continents, and China.

In a mighty pulsing like the march
Of pioneers across the western plains,
A nation's march from ocean to ocean,
He flung the Bridge and heard its singing strings,
A chain of strength to bind a continent
And leap through space to reach his goal
—Fulfillment of man's hunger.

He saw the throb of machines
Emerge from the earth's dark into light,
Transformed like the Bridge in its skyward curve,
A giant hand to set free man's longing
—And lift him to the stars.

His journeys now were done;
Broken, spent, the poet sang no more.
But still driven by a restless fire,
Southward he sailed, and found the peace he sought
In one last leap into the sea he loved.

D. B. STEINMAN

X-TG140
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CHROMATONES

EVOLUTION

By D. B. Steinman

In ancient reign of fang and claw,
When cruel struggle was the law,
The feral and the ruthless thrived,
The killer and the brute survived.
These bred the race and multiplied
While those with gentler instincts died.
For that was evolution's plan
In primal phase — "Descent of Man."

A new dawn: Man was more than clod,
And men appeared who walked with God.
The prophet, poet, artist, sage.
Lit beacon lights beyond their age.
No longer brute, now heart and soul
Are pointed upward toward a goal.
For this is evolution's plan
In crowning phase — "Ascent of Man."

— *David B. Steinman*

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DIE Hausfrau

Juni 1957

Horizons in Engineering

by D. B. Steinman
(National Honor Member)

HORIZONS are not boundaries. The future of engineering is unbounded. There is no limit to future progress and achievement.

The horizon is merely the line of tangency circumscribing that which is immediately visible. There are always vast areas beyond the horizon. The opportunities for future discoveries and inventions are unlimited.

The one assured fact is that horizons are ever expanding. As we scale new heights, new and greater horizons come into view.

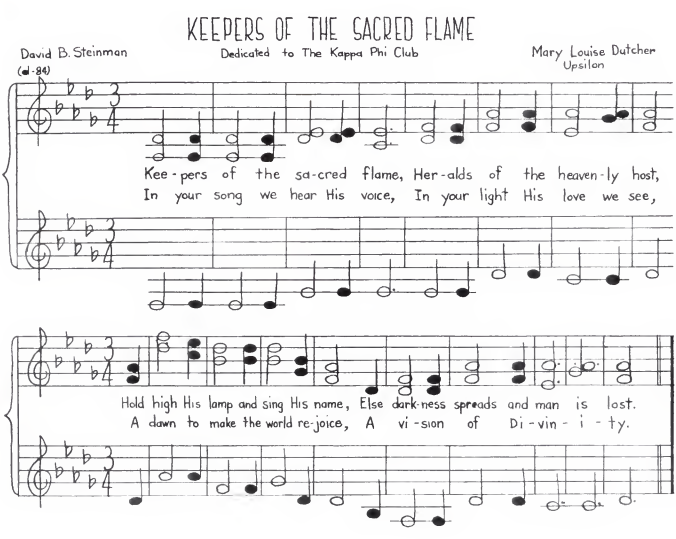
When we stand on the seashore, our horizon is a circle of three miles radius. When we ascend to the top of the Empire State Building, our horizon is enlarged to a radius of 41 miles. The area of our field of view is increased 200-fold.

Our one lesson from past experience is never to underestimate the future of engineering progress. Each new discovery opens tremendous vistas of further invention and application. The quickening tempo is logarithmic. Each new generation, building on the past, sees more progress in science and engineering than was recorded in all the preceding centuries.

Before the dawn of history, the greatest engineering achievement was the invention and application of the wheel. This was man's first great improvement upon nature. The prehistoric genius who hit upon this apparently simple invention could not have visualized its future significance, the amazing vistas of mechanical progress thereby made possible. Hardly any subsequent engineering advance would have been possible without the wheel in its manifold developments, symbolized by all the indispensable wheels of industry, transportation, and power. One invention led to millions of others. If all the wheels used, consciously or unconsciously, in our daily lives were suddenly destroyed, our civilization would collapse.

An address at the University of Florida, March 11, 1957, following the dedication of the David B. Steinman Faculty Lounge

The Candle Beam of Kappa Phi



KEEPERS OF THE SACRED FLAME

Rae Dennison (Epsilon)

To span the gap from man to man
Construct a bridge not made by hands,
Not wood or stone or iron hands —
Of Human Kindness build the span.

—David B. Steinman

These are words written by one of the world's greatest bridge designers and engineers, David B. Steinman, and express the great need for building BRIDGES OF LOVE. Dr. Steinman is the designer of the Mackinac Bridge in Michigan which was recently opened, as well as many other beautiful and useful bridges around the world. He is not only aware of the importance of linking land to land but also of linking man to man through love.

Dr. Steinman was a very generous contributor of materials for the 1957-58 Program and Devotional Book and wrote and dedicated a poem entitled "Keepers of the Sacred Flame" to The Kappa Phi Club. This poem was presented at the Council of Chapters and delegates were asked to write music to accompany this lovely poem. Mary Louise Dutcher (Upsilon), National Program Director, closed her challenging Council experience by composing appropriate music. The words and music become more meaningful each time they are read or sung and will live in the hearts of Kappa Phis as they remember BRIDGES OF LOVE.

HART CRANE and the BRIDGE

by D. B. STEINMAN

He felt the spell of it—the span that arched
Above the harbor traffic and its sounds.
For his compelling fever to create
A rhythmic pattern from life's tangled skeins,
He found the vision and the symbol here:
The parabolic arc that man had spun
To cleave the blue above the city's tides.

It spoke to him, as did the echoes here,
Within this house, this very room, wherein
Another in dark agony had dwelt
And made his bid for immortality.
From this same attic on the Brooklyn shore,
Through years of racking pain and loneliness,
The stricken builder of the Bridge had watched
His dream take shape in stone and gleaming steel.

In burgeoning flame the poet's flight was launched.
Of cities and the open road he sang,
Of iron rails and workers in the fields,
Of farmboy memories of star and lake,
Of ribald South Street and the sailor's chants,
Of Istanbul, Atlantis and Cathay.

In sturdy, singing cadence, like the march
Of pioneers across the western plains—
A nation's cavalcade from sea to sea—
He hymned the Bridge and heard its choiring strings
Embrace the wind and vault a continent,
Soaring through space to reach that goal of song—
Fulfillment of the hunger that is Man.

He saw the naked power of machines
Emerge from tunnel darkness into light,
Transmuted, like the Bridge, in skyward curve;
Here was a godlike, liberating hand
That lifted Man and drew him to the stars!

*

And then, one day, the poet's flight was done;
Now weary, spent, the lyric voice was mute.
And yet the strange, consuming fire was there,
Its torturing tongues pressed tightly to his flesh.
Southward he sailed to end his fevered course
In one last leap into the sea he loved.

X. TG 140
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THE STORY OF THE ANCIENT AND MOST EXALTED GREEK ORDER OF SAINT DENNIS OF ZANTE

PUBLISHED BY
THE INTERNATIONAL AMERICAN INSTITUTE
WASHINGTON, D. C.
MCMLVIII

BENEFACTORS OF THE ORDER OF ST. DENNIS

Dr. David Barnard Steinman
Dean of American Bridge Builders
Knight Grand Cross of the Greek Order of St. Dennis of Zante

'THE MUSE'

WINTER, 1958

X. TC 140
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FEATURED POET

David B. Steinman

Our featured poet for the Winter issue of THE MUSE is Dr. David B. Steinman of New York City. Dr. Steinman has distinguished himself both as a poet and as a builder of bridges. He has over four-hundred bridges to his credit, at home and abroad, some of the largest bridges in the world were built by this master builder. Poetry is a recent avocation with him and he has had his work published in all the leading magazines and poetry journals.

He has also published some books of poetry and has established a Poetry Forum at Loyola University, Tufts University, and Boston College.

We are happy to present five poems by this talented builder of bridges and poems.

WIND AND SPAN

Tender the wind who with a lover's sigh
In low harmonics wooed the slender span,
Glad of her grace beneath a summer sky
As through her arch the wayward wind began
To play caprices like an aerofoil,
From beam to stern, from bank to parapet,
While all her wires dared him to despoil
Her vibrant strength. Not yet, he sang, not yet!

Bolder the wind. He tried the web of steel;
She nothing yielded, braving his pursuit.
More lyrical his voice, like bells that peal
On distant towers: his suit became her suit
Till they were one in song, the loved and lover,
As from the roost of sky on wings of mist
The dull gray bird of cloud came down to cover
Both wind and span in their most secret tryst.

Wilder the wind: now lunging like a bull,
He charged the span as if to crush his prey.
The fury mounting in her to the full,
As rivets snapped and girders ripped away,
In sudden headlong plunge she struck a loud
Rejoinder where the heavy white-capped water
Waited (as the earth does for the proud)
To lay at rest a lost rebellious daughter.

Voiceless the wind and hushed the world about him;
Summer no more, but autumn in the air.
Nothing now stands on either shore to flout him
As leaves turn color and the sky is fair.
Voiceless the wind; vanished the span that fell
Before the sun shot gold upon the wave
That laps the pier; while from a harbor bell
A muted sea-dirge tolls above the grave.

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*THE STEINMAN POETRY LECTURES**

AND

THE UNIVERSITY LECTURES

1958-1959

Tuesday, October 14	POETRY FOR OUR TIME. Associate Professor John Holmes, Department of English.
**Monday, October 20*	*ARCHIBALD MACLEISH, reading from his poems.*
Tuesday, October 28	THE PERSONAL QUALITY OF VERGIL'S ART. Professor Van L. Johnson, Chairman, Department of Classics.
Tuesday, November 18	DANTE AND HIS WORLD. Professor George H. Gifford, Wade Professor of Modern Languages.
**Wednesday, December 3*	*JOHN CROWE RANSOM, reading from his poems.*
**Monday, February 16*	*RICHARD WILBUR, reading from his poems.*
Tuesday, March 10	DONNE VS. SHAKESPEARE: THE ISLAND AND THE CONTINENT. Professor Kenneth O. Myrick, Chairman, Department of English.
**Wednesday, March 18*	*CARL SANDBURG, reading from his poems.*
Tuesday, April 14	WHITMAN: POETRY FOR DEMOCRACY. Associate Professor Wisner P. Kinne, Department of English.
**Monday, April 20*	*JOHN CIARDI, reading from his poems.*
Tuesday, April 28	ELIOT: POETRY AND CHRISTIANITY. Assistant Professor Sylvan Barnet, Department of English.

This combined series of poetry readings and lectures is open to the Tufts University community at large. The readings of the five major American poets (listed in italic) comprise the Steinman Poetry Lectures, and are given on the dates listed in Cohen Auditorium at 8:00 P.M. The University Lectures, each given by a distinguished member of the Tufts faculty, are intended to provide a continuing discussion of the historical context in which the poets' readings are made. These lectures are given at 8:00 P.M. in the Coolidge Memorial Room, Ballou Hall, on the dates listed.

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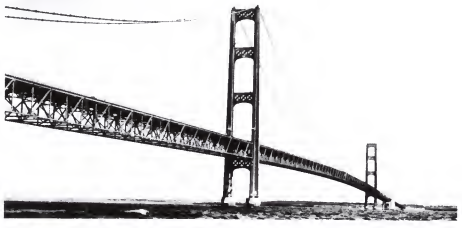
The Detroit News

DECEMBER 21, 1958



Mackinac Bridge—'Greatest in World'

Gazing at 'Mighty Mac'

MIGHTY MAC, by Lawrence A. Rubin; Wayne State University Press.

By STODDARD WHITE

Sault Ste. Marie and St. Ignace were discovered almost a century before what is now Detroit. Not until 1669, or 32 years before Cadillac landed, did white men even set foot in the Lower Peninsula.

Coming west from what are now Montreal and Toronto, the early explorers took a northern route which led them onto the Great Lakes at Georgian Bay. Even Niagara Falls was a belated discovery.

The early explorers looked with amazement — or paddled through — the Straits of Mackinac. This was a passage between Lakes Huron and Michigan, not a crossing place between the Upper and Lower Peninsulas.

Even as civilization developed in both peninsulas, roads and railroads ended at the water's edge. Autos, trains and foot passengers were ferried across the barrier—and many a northbound tourist turned back at Mackinac City when he learned he had a long boat ride ahead.

Little more than a year ago, the barrier was forever broken. Steel and wire of the Mackinac Bridge linked the peninsulas and united Michigan for the first time.

In paraphrase, these are the words of Frank B. Woodford, Detroit newspaperman and historian. To him, author Rubin, executive secretary of the Mackinac Bridge Authority, must be indebted for his introduction—words in a book composed mainly of pictures.

Rubin's work has been, of necessity, largely selection and editing. This book is the pictorial story of the bridge, from the days before it was begun until the day it was dedicated—longest suspension bridge in the world.

The builder, D. B. Steinman, says in the book it is "the greatest bridge in the world." Having designed many of the greatest, he should know.

Rubin's chief debt—and that of the reader—is to the bridge's photographers. Four thousand pictures and 14,000 feet of movie film were shot during the four years of construction. The book, "Mighty Mac," is a skillful culling of these to about 200, a step-by-step picture of an unsurpassed engineering feat.

Excellent photography is matched by imaginative design, typography and binding which make the book a valuable souvenir as well as a valuable record.

Prentiss M. Brown, chairman of the bridge authority, identifies this as not only the authority's official pictorial history, but the second of three books.

Neither the first—which will tell the over-all story in words—nor the third—the record of the bridge since it opened Nov. 1, 1957—has yet been written. But they are envisioned as companion volumes.

Stoddard White is The Detroit News marine writer.

X. TG 140

Dedication of Michigan's Mackinac Bridge

Dr. STEINMAN'S DESIGN

"One Of The Greatest Engineering Accomplishments Of Our Time"

From Our New York Correspondent.

Michigan's Mackinac Bridge, the largest suspension bridge of the world, was dedicated now after four years of construction work, and it really is a marvellous work. Wilber **M. Brucker**, Secretary of the Army, described the new five-mile span linking Michigan's upper and lower peninsulas as "one of the great engineering accomplishments of our time."

Dr. Steinman's Achievements

The Franklin Institute in Philadelphia has presented its Louis E. Levy Medal to the designer of the Mackinac Bridge, Dr. David **B. Steinman**, famous bridge builder. He received the medal in recognition of his outstanding paper," The Design of the Mackinac Bridge for Aerodynamic Stability". Here are a few features of Dr. Steinman's important new principles.

The main span at Mackinac is a suspension bridge. The stiffening trusses are 38 feet deep, or 1/100th of the span length. This is the same ratio adopted, after years of exhaustive aerodynamic tests, for the proposed Severn River Bridge in England, and 68% greater tthan the ratio of San Francisco's Golden Gate Bridge.

An important feature contriibuting to the high degree of aerodynamic stability is the provision of wide open spaces between the stiffening trusses and the outer edges of the roadway. The trusses are spaced 68 feet apart and the roadway is only 48 feet wide, leaving open spaces 10 feet wide on each side, for the full length of the suspension bridge. For further perfection of the aerodynamic stability, the equivalent of wide longitudinal opening is provided in the middle of the roadway.

The two outer lanes, each 12 feet wide, are made solid, and the two inner lanes and the centre mail (24 feet of width) are made of open grid construction. Wind-tunnel tests have confirmed the high aerodynamic stability of this design of cross-section. "The Mackinac Bridge represents a triumph of the new science of suspension bridge aerodynamics."

The outstanding superior aerodynamic stability achieved in the Mackinac Bridge is best shown by a comparision with the critical velocities determined also by wind-tunnel investigation for other notable suspension bridges. Dr. Steinman lists the critical wind velocities for the prior long-span bridges in the following tabulation:

Bridge	Critical Wind Velocity
Bronx-Whitestone, after addition of stiffening trusses	30 m.p.h.
Golden Gate	40 "
George Washington	55 "
New Tacoma Narrows	76 "
Makinac, with deck closed	632 "
Mackinac, with deck open, as designed	Infinite

A thorough aerodynamic investigation was conducted by Professor F. B. Farquharson in the Suspension Bridge Laboratory at the University of Washington covering the degree of aerodynamic stability inherent in the design of the Mackinac Bridge. It was shown that the aerodynamic stability of the Mackinac Bridge exceeded all prior experience in aerodynamic investigation.

The wind-tunnel tests at the University of Washington showed conclusively, as predicted by Dr. Steinman, that the Mackinac Bridge, as designed has the following features:

1) Complete and absolute aerodynamic stability against **vertical** oscillations at all wind velocities and all angles of attack;

2) Complete and absolute aerodynamic stability against **torsional** oscillations ata ll wind velocities and all angles of attack;

3) Complete and absolute aerodynamic stability against **coupled** oscillations (combining vertical and torsional) at all wind velocities and all angles of attack.

The Mackinac Bridge with its approaches is 5 miles long. Its length from anchor bl ock to anchor block — between the ends of the 24½-inch cables that hold up the roadway — is 8164 ft., or about 2000 ft. longer than the Golden Gate Bridge.

Another way of measuring suspension bridges is by the distance of the centre span, from tower to tower. Using this method the Golden Gate Bridge over the entrance to San Francisco Bay, with a 4,200 central span is 400 feet longer, while the central span of another famous suspension bridge the George Washington Bridge in New York, is 300 feet shorter.

The $100,000,000-bridge is also the costliest in the world. The bridge is painted in forest green. It hangs from steel cables strung in a parabolic arc between giant towers as high as a fifty-seven-story building (above water height is 552 feet).

Why Was the Bridge Built?

The new bridge spans the Strait of Mackinac between Lake Michigan and Lake Huron. These waters divide the State of Michigan into the densely populated and highly industrialised Lower Peninsula (with the industrial metropolis Detroit) and the sparsely populated Upper Peninsula. The latter has immense natural resources (part of it is known as "The Copper Country") and is a popular vacation region.

The state ferry service, which has been operating across the straits for some thirty-five years, was discontinued shortly after the bridge opened. Access to the Upper Peninsula now is easy. The five-mile ferry crossing took duced the crossing time to ten to over one hour. The bridge has retwelve minutes. During the summer months, lines of waiting cars had extended along the highway as far back as 30 miles from the ferry.

Drivers had to stay over nights in cottages and boarding houses to resume their place in line in the morning. At an average toll rate of $3.25 (£A1/8/-) for **passenger cars, more for trucks and buses, the estimated traffic will be two million cars and trucks in the current year. The bridge is supposed to pay for itself in 18 years.**

Ultra-Safety of the Bridge

Some other bridges built by Dr. Steinman are the Thousand Islands International Bridge, the Mount Hope Bridge in Rhode Island, the St. John's Bridge in Portland, Oregon. He made the designs for the bridge across the South Channel of St. Lawrence River, **and for the designs for the bridge which is planned to cross one day the Messina** Strait between Sicily and Southern Italy.

The Public had been alarmed by unscientific claims that no structure could withstand the ice pressure at the Straits of Mackinac. The maximum ice pressure ever obtained is 21,000 pounds per lineal foot of pier width. Dr. Steinman multiplied this figure by five, and designed the piers to be safe for a hypothetical, impossible ice pressure of 115,000 pounds per lineal foot.

Similarly, because the public had been told that no structure could resist the force of storms at the Straits, the design was made ultra-safe against wind pressure by Dr. Steinman. The greatest wind velocity ever recorded in the vicinity is 78 miles per hour; **this represents a wind force of 20 pounds per square foot. He multiplied this force by 2½ and designed the bridge to be ultra-safe against a hypothetical, improbable wind pressure of 50 pounds per square foot.**

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The Tablet

1908-1958 50th ANNIVERSARY

A CATHOLIC WEEKLY

BROOKLYN 17, N. Y., SATURDAY, DECEMBER 13, 1958

The Star of Bethlehem

A million stars proclaimed Thy glory,
With new-born light in one of them,
The brightest in Thy diadem,
To point the way to Bethlehem,
When Love Divine was born.

A million hearts enshrine Thy story;
Aglow with love as carols ring,
We hear the angel voices sing
As once to shepherd and to king
On that first Christmas morn.

—D. B. STEINMAN.

X. TG 140

BAU-MASCHINE UND -TECHNIK

Building Machinery and Construction Methods
Machines et Techniques de Construction

5. Jahrgang | November 1958 | Heft 11

Die Mackinac-Brücke

Durchführung der Bauarbeiten und Einsatz von Baumaschinen

Construction equipment on the Mackinac Bridge

L'équipement utilisé pour la construction du pont sur les Straits of Mackinac

Dr. D. B. Steinman und J. W. Kinney, New York

Zusammenfassung

Nach einem kurzen Überblick über das gesamte Brückenbauwerk mit 5,5 km Länge wird zunächst über die Gründungsarbeiten an den Brückenpfeilern berichtet, insbesondere an den Pfeilern der Hängebrücke, die mit 2550 m Gesamtlänge die größte bisher gebaute Hängebrücke ist. Der Einsatz der hauptsächlich schwimmfähig ausgebildeten Baumaschinen, Kräne, Bagger und einer Betonfabrik, wird an Hand von Abbildungen erläutert. Auch über die einzelnen Phasen der Montage des Brückenbauwerks in Stahlkonstruktion mit Betonfahrbahnplatte und Asphaltbeton als Verschleißschicht wird berichtet.

Summary

The water crossing is 17,913 feet long, consisting of a suspension bridge across the channel, and deck truss construction at both sides of the channel crossing. The land approaches including two viaducts, a filled causeway, a toll plaza, and the north approach road, bring the project length to five miles. The suspension bridge is 8,614 feet overall, the longest yet built. The machinery and equipment (cranes, a concrete mixing plant, etc.) was mostly mounted on steel barges. The steel erection equipment was of the conventional type, but some of the equipment ordinarily used on suspension bridge towers, cable spinning and stiffening truss erection were peculiar to this type of work. Conventional concrete was used on the deck and the wearing surface was made of asphaltic concrete.

Résumé

Le pont propre a une longueur de 5,5 km. Les auteurs discutent d'abord les travaux de fondation pour les piliers du pont, en particulier pour les pylônes. Le pont suspendu a une longueur totale de 2550 m et est le plus long qui ait jamais été construit. Les illustrations montrent l'équipement en machines pour la plupart flottantes utilisé pour la construction. L'article traite aussi les différentes phases du montage des éléments en acier ainsi que de la mise en oeuvre du béton de tablier et du béton asphaltique de la couche d'usure.

Von dem bekannten amerikanischen Brückenbauer, Dr. D. B. Steinman, der den Entwurf für die Mackinac-Brücke ausgearbeitet hat, und J. W. Kinney, seinem für die Bauausführung verantwortlichen Mitarbeiter, ging uns ein Bericht über den Bau dieser Brücke zu, dessen deutsche Fassung wir nachstehend veröffentlichen.

Bild 1. Luftaufnahme der fertigen Mackinac-Brücke von Südwesten
Mackinac Bridge from the Southwest / Vue aérienne du pont sur les Straits of Mackinac vu du sud-ouest

X . TC 110
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'THE MUSE'

IN A GARDEN LONG AGO

D. B. Steinman

I remember summer roses in a garden long ago;
You were with me, my beloved, in the golden moonlight glow.
A nightingale was singing in the dreamy woodland grove
And all the longing of my heart was in his song of love:
You are sweet, sweet, sweet, my darling,
Oh, my love, I love you so!
The nightingale was singing in a garden long ago.

I remember summer magic, all the sweetness in the air,
The honeysuckles blending with the fragrance of your hair.
The melody of moonlight and the starlight in your eyes
Were mingled with the glory of the stars that filled the skies.
You are sweet, sweet, sweet, my darling,
Oh, my love, I love you so!
All the stars were singing in a garden long ago.

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American Engineer

DECEMBER 1958
Vol. 28, No. 12

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
FOUNDED 1938

The Classics of Engineering Literature

By

WALTER JAMES MILLER

Associate Professor of English, New York University

The author writes that the name of Dr. D. B. Steinman, above, is "certain to remain on any bibliography of major engineering authors."

* * *

ANOTHER name certain to remain on any bibliography of major engineering authors is D. B. Steinman. He has published hundreds of interesting, sometimes exciting, pamphlets, articles, papers, books on the mathematical, esthetic, structural, ethical, theoretical facets of bridge building. Typical of his cogent, swift prose, his masterful attack on technical subject matter, is his paper on *The Design of the Mackinac Bridge for Aerodynamic Stability* (1957).

Rensselaer Polytechnic issued a 28-page bibliography of the *technical* writings of D. B. Steinman.

* * *

X. TC 119
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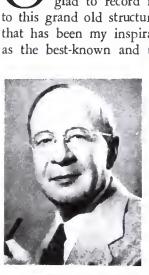
VOLUME XLIX DECEMBER, 1958 NUMBER 4

TRIBUTE TO THE BROOKLYN BRIDGE

By D. B. STEINMAN, *New York Alpha '06*

ON THIS occasion of the 75th anniversary of the opening of the Brooklyn Bridge, I am glad to record my personal heartfelt tribute to this grand old structure, not only as "The Bridge" that has been my inspiration since boyhood but also as the best-known and the best-loved bridge in the world.



D. B. STEINMAN

When the Brooklyn Bridge was completed in 1883, it was the engineering achievement of the century—the longest single span ever built, the tallest and strongest, the first suspension bridge in the world to use steel cables and steel trusses. Today there are bigger bridges, but they never could have been built had not Brooklyn Bridge shown the way. And its story is still the greatest bridgebuilding story of all.

JOHN A. ROEBLING was the pioneer genius who developed the art of building great spans suspended from wire cables. In 1831 he came to America as a young immigrant, fleeing autocratic oppression and seeking freedom—freedom to work, to build, to achieve. During the years that followed he proved his talent and genius as an inventor and as a bridgebuilder, inventing wire rope and building one great span after another.

In 1867 he was called to New York to plan and build his crowning lifework, the great span over the East River to connect Brooklyn and New York. For two years he worked feverishly to complete his plans, as though in a race against death.

It was to be his dream bridge, the consummation of his life's ambition. From his first sight of a small suspension span in his student days, all of his longing, all of his preparation, all of his striving, were pointed toward this goal. By iron determination, by relentless concentration, by unsparing energy, by achievement after achievement, he had won this opportunity to create the world's greatest span. And now, from his brain and his soul, combining the genius of the mathematician, the builder, and the artist, he had crystallized the vision—the lines and the form, the power and the grace, the beauty and the magic of his masterwork. He had battled and overcome the forces of doubt and prejudice, and he had finally won the right to go ahead with the building of the Bridge.

IN HIS heart and in his mind he saw the great bridge of his dreams—the magnificent pylons, enduring as the pyramids, founded on solid rock deep below the rushing tides; the powerful cables of steel sweeping downward and upward in the arc of Nature's law; and the arching roadway carrying the multitudes over a span greater and more beautiful than the world had ever seen.

He saw it clearly as it was to be, "a great work of art," "the great engineering work of this Continent and of the age." Time was to justify his prophecy, and posterity was to behold the magic and the power of the thing he had created.

But he, who had dreamed and planned all this, was not to see the time-defying towers, or the vast sweep of the mighty cables, or the rushing thousands crossing on the far-flung span. He was not to see his bridge take form. He was not even to see the first stone laid.

TRAGEDY struck. On July 6, 1869, while he was making the final surveys, the accident occurred which took the life of John A. Roebling. At the end of the race, with the goal in sight, fate exacted its toll —a toll doubly cruel by its timing.

The master builder's dying words were, "The bridge will be beautiful!"

With its inspiration gone, the Brooklyn Bridge seemed impossible to build. A new guiding spirit was needed to carry the great work forward.

Dr. Steinman, internationally eminent engineer, has won many honors for his achievements in bridge design and construction. One of his greatest accomplishments is the Mackinac Bridge in Michigan, recently completed, and he is currently designing a bridge across the Bosporus in Turkey. He was engaged a few years ago to supervise the modernization of the Brooklyn Bridge, in the shadow of which, on New York's lower east side, he was born and raised.

X. TG 140
. S 8

Christmas Sleigh-Ride

By D. B. STEINMAN

When love was young and hearts were gay,
Who minded wintry weather?
All snugly bundled in the sleigh,
We sallied forth together.

When cheeks were flushed and lips were warm,
Who minded snow-flakes clinging?
Our joy rang out above the storm,
In tune with sleigh-bells ringing.

Through sunset glow and first star-bright,
What brought the tender yearning?
We glided home toward candle light
And warmth of Yule-logs burning.

Wanderlust

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MOONLIGHT SERENADE

Across the lake the rising moon unrolled
A magic carpet made
Of luminous brocade,
A path of silver light with flakes of gold,
A moonlight serenade.

No matter where I row along the shore,
The shimmering mystery
Still arrows straight to me,
And in the rippled glow I hear once more
A moonlight melody.

— D. B. Steinman

X. TC 110
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The American Bard

October, November, December, 1958

An Angel Came To Dwell With Me

An angel came to dwell with me —
A woman, humanly divine;
My life became a melody,
My love a hymn, my heart a shrine.

When I was sad with care and strain,
My solace was her tenderness;
For every sorrow, every pain,
Her love was there, to heal and bless.

When years of thankless toil slipped past,
I found my guerdon in her eyes;
And when life's laurels came at last,
Her tears of gladness were my prize.

In sunset glow, as shadows fall,
I watch the light of day depart.
O, evening star! I hear your call
To join the one who holds my heart.

— *David B. Steinman*

New York

X. TG 11?
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American Engineer

DECEMBER 1958
Vol. 28, No. 12

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

The Classics of Engineering Literature

By
WALTER JAMES MILLER
Associate Professor of English, New York University

The author writes that the name of Dr. D. B. Steinman, above, is "certain to remain on any bibliography of major engineering authors."

* * *

ANOTHER name certain to remain on any bibliography of major engineering authors is D. B. Steinman. He has published hundreds of interesting, sometimes exciting, pamphlets, articles, papers, books on the mathematical, esthetic, structural, ethical, theoretical facets of bridge building. Typical of his cogent, swift prose, his masterful attack on technical subject matter, is his paper on *The Design of the Mackinac Bridge for Aerodynamic Stability* (1957).

Rensselaer Polytechnic issued a 28-page bibliography of the *technical* writings of D. B. Steinman.

Steinman has written the current articles on "Bridges" for several standard encyclopedias; superb magazine articles on such subjects as "Beauty and Its Vocational Symbols;" and four popular books. *Miracle Bridge at Mackinac* (1957, in collaboration with J. Nevill) actually makes the most technical difficulties of this project intelligible to the public. *Bridges and their Builders* (1910, in collaboration with S. Watson) is more than a good history: it is an intellectual chronicle of the fight against ignorance and prejudice, a dedicated study of the kind of moral character that makes an engineer. Steinman has also used verse as a medium for perspective on his life and his world; he has published a small volume and won several respectable poetry prizes. Like Telford, he has earned the praise of professional poets; Marianne Moore, for example, has enjoyed his "concept of the bridge as a 'rainbow'." Steinman is at his best in his intellectual and narrative poetry, in which he speaks trenchantly of evolution, racial discrimination, symbolism of the bridge.

* * *

D. B. STEINMAN
Consulting Engineer, New York

X. TG 140
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LONG-SPAN BRIDGES

GREAT spans are man's defiance of nature's challenge. Bridges are an expression of man's constructive spirit — his urge to overcome barriers, to master the forces of nature, to speed travel, to link communities, to widen horizons. In many ways the story of bridgebuilding is the story of civilization. In region after region around the globe, the development of a country has awaited the building of bridges and has kept pace with the progress in the art.

Around 1870, the era of long-span bridges was born. Bridge building began to be transformed from an empirical craft to a scientific art. As the design of bridges evolved, so did their materials. With steel and mathematics, the ugly iron trusses of the early railroad era gave way to new bridge forms, forms combining strength and beauty — the modern arch, cantilever, continuous truss, and suspension bridges.

The longest spans thus far attained for the various bridge types are presented in Table I.

Arch Bridges

The longest-span arch bridges are given in Table II.

The Eads Bridge over the Mississippi River at St. Louis, built 1867-74 by Capt. James B. Eads, with three hingeless arch spans of 502, 520 and 502ft, was the largest and boldest arch bridge of its day, and is still in use. This structure represented the first use of pneumatic caissons in the founding of large piers, the first major use of the cantilever method, the first use of hollow tubular chord members, and the first use of high-strength alloy steel as a bridge material. Its success inspired modern steel arch construction.

One of the greatest arches of all time was the Hell Gate Bridge over the East River at New York City, with a span of 977ft, completed in 1917 — the crowning achievement of Gustav Lindenthal. The suspended roadway carries four railroad tracks on a heavy ballasted floor. The outline of the arch, framed between great masonry towers, produces a monumental composition.

TABLE II. — LONGEST-SPAN ARCH BRIDGES

Year	Bridge	Location	Span (in feet)
1931	Kill van Kull	New York City	1652
1932	Sidney Harbour	Australia	1650
1935	Birchenough	Southern Rhodesia	1080
1955	Nagasaki-Sasebo	Kyushu Is., Japan	1042
1917	Hell Gate	New York City	977‡
1941	Rainbow	Niagara Falls	950

Inspired by the Hell Gate arch, the Sydney Harbour Bridge, built 1924-32, is also a parabolic steel arch of the half-through type. The ambition of the Australians to boast the longest arch span in the world was frustrated, however. Another arch, begun five years after the Sydney Bridge but completed four months earlier (1931), was made 25 inches longer in span. The Sydney Span is 160ft; the Bayonne Bridge over the Kill van Kull at New York City was made 1652ft 1in. In 1935 Ralph Freeman completed the Birchenough Bridge in Southern Rhodesia, with an arch span of 1080ft, the third longest in the world.

TABLE I. — THE WORLD'S LONGEST SPANS FOR VARIOUS BRIDGE TYPES

Type	Bridge	Location	Year Completed	Span (in feet)
Cable Suspension	Golden Gate	San Francisco	1937	4200
Transporter Bridge	+ Sky Ride	Chicago	1933	1850
Cantilever	* Quebec	Canada	1917	1800
Steel Arch	Kill van Kull	New York	1931	1652
Eyebar Suspension	* Florianopolis	Brazil	1926	1114
Concrete Arch	Sando	Sweden	1943	866
Continuous Girder	River Save	Belgrade	1956	856
Continuous Truss	Dubuque	Mississippi River	1943	845
Simple Truss	* Metropolis	Ohio River	1917	720
Vertical Lift	* Cape Cod Canal	Massachusetts	1935	544
Wichert Truss	Homestead	Pittsburgh	1937	533‡
Swing Span	* Fort Madison	Mississippi River	1927	525
Tubular Girder	* Britannia	Menai Straits	1850	460
Timber Span	* McKenzie River	Coburg, Ore.	1926	380
Prestressed Concrete Girder	Worms	Germany	1953	375
Baseule	* Sault Ste. Marie	Michigan	1914	336
Simple Girder	Harlem River	New York	1951	330
Masonry Arch	Plauen	Saxony	1903	295
Single Leaf Bascule	* 16th Street	Chicago	1919	260
Concrete Girder	Villeneuve	Seine River	1939	256

+ Not standing. *Railroad bridge

INSTITUTO TÉCNICO DE LA CONSTRUCCIÓN Y DEL CEMENTO

X. TG 140
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DAVID B. STEINMAN

puente de Mackinac

Artículo publicado en el n.º 105 de la
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PATRONATO «JUAN DE LA CIERVA» DE INVESTIGACIÓN TÉCNICA DEL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

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ASTM BULLETIN

September 1958

Technical Committee Notes

ASTM STANDARDS AT WORK

ASTM Helps Realize a Dream

THE DREAM of uniting by highway the two peninsulas which form the state of Michigan is an accomplished fact now that the Mackinac Straits Bridge has been completed.

The structure spans the Straits of Mackinac from Mackinaw City to St. Ignace on the upper peninsula. It is the world's largest suspension bridge, measuring 8614 ft from anchor block to anchor block. The entire bridge, including approaches, is 26,444 ft in length.

Officially opened to traffic on Nov. 1, 1957, the bridge cost about $100,000,000 and required the concentrated engineering talents of Merritt-Chapman & Scott Corp., the American Bridge Division and American Steel and Wire Division of United States Steel Corp., and David B. Steinman, Consulting Engineers and Designers.

Some 26 ASTM standards were used to specify materials in this new link in American highways. Among those used to specify steel and steel products were A 7, A 27, A 94, A 141, A 194, A 235, A 237, A 325, A 354, and A 48.

Standards applicable to the concrete and associated products included A 15, A 305, C 33, C 150, C 175, C 260, C 330, D 544, and D 1190. Standards used for materials for the electrical systems included A 72, A 252, B 8, B 152, D 27, and D 120. Construction lumber, in part, was designated by Standard D 245.

Construction Box Score

Total length of bridge with approaches, ft	26 444
Length of main span (between towers), ft	3 800
Heights of main towers above water, ft	552
Height of roadway above water at midspan, ft	199
Total length of wire in main cables, mile	42 000
Maximum tension in each cable, ton	16 000
Number of wires in each cable	12 580
Total concrete in bridge, cu yd	466 300
Total weight of bridge, ton	1 024 500
Total number of steel rivets	4 851 700
Total number of steel bolts	1 016 600
Total number of blueprints	85 000

MICHIGAN'S MIGHTY MACKINAC

#41

From *Engineering News-Record* and *U. S. Steel News*

THE MIGHTY Mackinac Bridge will be studied by bridge engineers from all over the world for the lessons it can teach in construction procedures and its wind resistant provisions. It is the longest uninterrupted crossing over water in the world—nearly five miles, of which three-and-two-fifths miles are spanned by steel. Nearly half of this is covered by the world's second longest suspension bridge.

A suspension bridge was required across the Straits of Mackinac because it is the only type of structure capable of spanning the deep channel. It replaces five ferries, which in favorable weather could transport 416 automobiles an hour for a 45 to 55 minute trip as compared to 600 cars per hour for a ten to twelve minute trip on the bridge—without any interruption from ice or wind.

Each of the 552-ft towers contains 6500 tons of steel topped by two 30-ton saddles that cradle the suspension cables. Overall, there are 66,500 tons of steel in the superstructure. The towers are supported by piers descending 200 ft to bedrock, and the anchorages for the cables rise as high as a ten-story building above water level and cover almost as much area as one-third of a football field.

The identical suspended side spans are 1800 ft long, extending from the towers to piers carrying the cable bents. The cables are extended over these steel frames to cable anchorages 472 ft closer to shore. By locating the cable terminals beyond the ends of the suspended spans, it was possible to place the anchorages where rock foundations could be found at moderate depths.

Since the bridge erection work could be carried on for only eight months of the year at the Straits, it was necessary to schedule operations carefully, with particular attention to the most difficult part of the project—the suspension span. Plans called for the erection of the backstay spans in 1955 so that catwalks for the cable spinning could be erected as soon as the Straits were free of ice in 1956.

In order to save erection time, each backstay span was assembled on shore and floated to the span site Falsework was erected on two barges with the top slightly higher than the level of the piers that the span would rest on. Then the backstay span—472 ft long and weighing 750 tons—was assembled on the falsework. After the barges were carefully maneuvered between the anchor and cable bent piers, the barges were flooded with water. As the barges settled deeper into the water and as the backstay span inched into its position atop the piers, it was fitted with anchorage shores and fastened with steel pins.

The bridge towers weathered a winter of heavy gales with only about half of the riveting completed. As is customary with such a structure, they were bolted together when they were erected, and the following spring they were replaced with rivets. Since the riveting and welding had to be done from the inside out, in dark confined cells, the men wore electric cap-lamps powered by special batteries. The stringing of extension lines would have created a footing hazard and possible short circuits through abrasive wear of the insulation. Each tower had a temporary construction elevator, which facilitated the movement of the riveters and their equipment to and from their work.

While riveting was being completed in the towers, the erection of the 28 approach spans got under way—16 on the south approach and 12 on the north. All the steelwork for these deck truss spans were fastened with high strength bolts.

Erection of the 89 stiffening trusses was a combination of time-tested methods on similar bridges and new procedures tailored to fit the particular job. The truss sections ranged up to 130 tons for one panel of two trusses with their cross bracing. They had to be hoisted a maximum of 155 ft above water level and the operation had to be synchronized to keep the sections level at all time.

Erection crews worked both ways from the towers. Since the bridge is symmetrical about its center line,

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Die Brücke über die Straße von Mackinac, USA

Von Dr.-Ing. Frank Schwarz, Holland, Michigan, USA

DK 624.5 Hängebrücken

1. Einleitung

Am 1. November 1957 wurde die längste Hängebrücke der Welt dem Verkehr übergeben. Die etwa 6 km lange Anlage überspannt die Mackinac-Straße zwischen dem Michigan- und Huron-See in den Vereinigten Staaten. Wie aus der Übersichtszeichnung (Bild 1

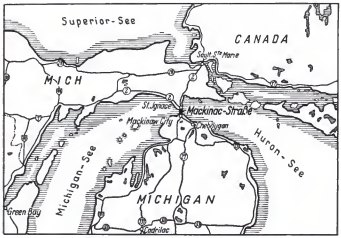

Bild 1. Geographische Lage der Mackinac-Straße in Michigan (USA)

und 2) ersichtlich, ist die Lage dieser Brücke recht eigenartig. Sie erhebt ihre 168 m hohen Pylone in einer flachen, spärlich besiedelten Gegend, fern von Großstädten und Industriezentren. Die nächsten Großstädte (Chicago und Detroit) sind 600 km weiter südlich.

Trotzdem erwartet man einen jährlichen Verkehr von rund zwei Millionen Fahrzeugen, die eine Gebühr von $ 3,25 pro Wagen (und entsprechend höhere Zölle für Lastwagen) zahlen werden. Auf diesen geprüften Verkehrsschätzungen hat man die Finanzierung der 100 Millionen $ gegründet, die für den Bau erforderlich waren.

Die neue Brücke stellt nämlich die kürzeste und bequemste Verbindung dar zwischen den industriereichen Staaten an den Ufern der großen Seen (Ohio, Indiana, Michigan) und den Staaten des Westens (Wisconsin, Minnesota, North Dakota usw.). Außerdem liegt die Mackinac-Straße in unmittelbarer Nähe der kanadischen Grenze im Herzen der Provinz Ontario, welche seit dem letzten Weltkrieg in einem ungeahnten wirtschaftlichen Aufschwung begriffen ist. Die Mineralschätze und Neuansiedlung von Immigranten haben die Errichtung zahlreicher neuer Industrien hervorgebracht, für welche die neue Brücke eine willkommene Verbindung zu den Vereinigten Staaten herstellen wird.

Zwischen den zwei kleinen Städten Mackinac-City und Saint Ignace bestand schon seit vielen Jahren eine staatliche Fähre für Straßenfahrzeuge, während die privaten Eisenbahnlinien ihre eigenen Trajektschiffe benutzten. Aufang der Jagdsaison bildeten sich an den Zugängen der Fähren bis zu 25 km lange Wagenkolonnen, die unglaubliche Wartezeiten, bis zu 16 Stunden, erforderten.

Als Ergebnis der eingehenden technischen und finanziellen Vorstudien, die die zu diesem Zweck 1950 gegründete Gesellschaft „Mackinac Bridge Authority" anstellte, wurde im Januar 1953 die endgültige Projektierung Dr. Steinman und Dipl.-Ing. Woodruff übertragen. Die Finanzierung gestattete jedoch erst 1954 mit den eigentlichen Bauarbeiten zu beginnen.

Die Brücke wurde trotz vieler technischer und klimatischer Schwierigkeiten programmgemäß am 1. November 1957 dem Verkehr übergeben. Auf diesen Termin waren auch die erwarteten ersten Einnahmen berechnet worden.

2. Allgemeine Beschreibung und Gründung

Wie aus Bild 3 ersichtlich, besteht die Mackinac-Brücke aus drei baulich getrennten Teilen: die südliche Auffahrt von 1735 m Länge, bestehend aus 16 Stahlfachwerkträgern auf Betonpfeilern; es folgt die eigentliche Hängebrücke, die sich von Verankerung zu Verankerung 2627 m erstreckt, mit einer mittleren Öffnung von 1158 m zwischen den zwei Haupttürmen, und schließlich die 1100 m lange nördliche Auffahrt (zwölf Fachwerkträger auf Betonpfeilern), die auf einen schon früher errichteten alten Damm übergeht.

Die freie Höhe der Brücke beträgt 46 m über normalem Wasserniveau, so daß die größten Frachtschiffe ungehindert gleichzeitig in beiden Richtungen unter der Brücke verkehren können. Die Brücke hat vier Straßenfahrbahnen mit einer Gesamtbreite von etwa 17 m, einschließlich eines Betriebssteiges. Die beiden Fahrtrichtungen sind durch einen 1 m breiten Streifen getrennt. Die Pylonfundamente wurden auf den Rand einer Unterwasserrinne im offenen Senkkastenverfahren gebaut. Jeder Pylon ruht auf zwei zylindrischen Eisenbetonfundamenten von je 12 m Durchmesser. Diese getrennten, runden Fundamente erstrecken sich von 8 m über Wasser bis 3 m unter Wasser. Von dieser Tiefe ab stehen sie auf einem gemeinsamen runden Fundierungsturm von ungefähr 38 m Durchmesser, der 70 m tief auf Urfelsen gegründet ist. Dieser Entwurf entstand aus der Notwendigkeit, eine möglichst geringe, runde Oberfläche zu erzielen, um das Anhäufen von Eismassen weitestgehend zu vermeiden.

Bild 2. Die Mackinac-Brücke in Dr. Steinmanns Original-Entwurf

FOR A FRIEND
D. B. Steinman

As we miss the warmth and sunshine
When the veils of night descend,
So we miss your cheery greeting,
Your cordial handclasp at each meeting,
Your cherished nearness as a friend.

Through the years of golden friendship
Our affection for you grew:
Wise without a tinge of vanity,
Moved with love for all humanity,
Guide and comrade, staunch and true.

Who can fathom time or reason
When a loved one must depart?
We who knew you, loyal, kind,
Will keep you evermore enshrined
In the sanctum of our heart.

Scimitar and Song

August, 1958

IN A GARDEN LONG AGO

D. B. Steinman

I remember summer roses in a garden long ago;
You were with me, my beloved, in the golden moonlight glow.
A nightingale was singing in the dreamy woodland grove
And all the longing of my heart was in his song of love:
You are sweet, sweet, sweet, my darling,
Oh, my love, I love you so!
The nightingale was singing in a garden long ago.

I remember summer magic, all the sweetness in the air,
The honeysuckles blending with the fragrance of your hair.
The melody of moonlight and the starlight in your eyes
Were mingled with the glory of the stars that filled the skies.
You are sweet, sweet, sweet, my darling,
Oh, my love I love you so!
All the stars were singing in a garden long ago.

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FALL OSCILLISCOPE 1958

Moment Of Splendor

Evanescent
as a crescent
of the moon,
As fireflies hover
glimmering over
a blue lagoon,
Love is a tender
moment of splendor,
dying too soon.

--D. B. Steinman

Gift
Author
Copy

JAN 20 1959

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THE AMERICAN POETS SPEAK 1957-1958

Edited MINNIE JANE FORSTER, Ph.D.

WHAT HOPE REMAINS

Endowed with powers noble as his creeds,
What hope remains when man does savage things?
His bright avowals are belied by deeds:
He wars and plunders while of love he sings.

But here, before our wondering eyes, there stands
A bridge! Outsoaring gravity and space,
It rises from the waves on shining strands
To arch across the sky in lofty grace.

Seen from above, a battleship appears
Dwarfed like a toy beneath the vaulting span;
This is our triumph over ancient fears:
A bridge of peace, wrought of the dreams of man.

. . . . *D. B. Steinman*

CHROMATONES

April Number

1958

A LEGEND OF CREATION

By D. B. Steinman

God proclaimed: Let there be Light!
He flung a million gleaming stars
Against the velvet black of night.

The clouds of glowing stardust swirled
To fill the skies with golden glory.
Then God reached out and made the World.

Three men stood by —a loyal band.
They saw each spinning planet hurled
In ordered orbit from His hand.

With Venus, Jupiter, and Mars,
The Earth, in flight-path, found its place
Amidst the galaxy of stars.

As they beheld Divine Creation
Shine forth in majesty through space,
The men knelt down in adoration.

And one man asked, "How was this done?"
God answered. "Seek, and thou shalt find!"
The quest of Science had begun.

"How beautiful!" cried one, inspired.
God said, "Thou too, create in beauty!"
With joy the Artist's soul was fired.

The third man yearned, with wonder filled,
To do such things as God had wrought.
God said, "Go forth—to plan and build!"

The Engineer, with consecration,
Went forth to dream, and build his dreams—
To add new works to God's Creation.

— David B. Steinman

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3

'The Muse'

THE BARN DOOR

D. B. Steinman

"Hi, young feller, want to see
Something you ain't seen before?"
The old man led me through his barn
And then rolled back a sliding door.
Behind us, musty timbered gloom;
Before us — apple trees in bloom!

The dawn glow lent an aura to
The orchard under springtime light;
Soft blossoms covered every bough
Like gentle snowflakes caught in flight.
Faint apple breath borne on the air
Whispered the lure of nectar there.

A spell was traced against the blue,
The inscape of a veil so spun
Of petals, air and light and dew.
"Ain't that a pretty sight, my son?"
He understood my speechless nod,
My silent thanks to him—and God.

SPRING 1958

PENINSULA POETS

Volume XIII *Winter* 1958 *Number* 1

CHILD OF ISHMAEL

Your infancy beheld a world that smiled,
And you smiled back — a happy, laughing child.

Too soon the years despoiled your paradise
Sheltered by love and hymned by lullabies.

Your tragedy is etched upon your face,
Pariah, branded for your alien race.

The cross of fire becomes a blasphemy —
Man's blazing boast of inhumanity.

Child of Ishmael, hounded by the pack,
Your only crime is that your skin is black.

—*David B. Steinman*
in Wisconsin Poetry Magazine

International Section

Projects Around the World

Sault Ste. Marie Span Nears Reality

FINANCING LIKELY FOR CROSSING FROM MICHIGAN TO ONTARIO

With the retention during June of Dr. D. B. Steinman, to prepare a preliminary survey report, in preparation for financing of the proposed $11 to $15 million international crossing of the St. Mary's River at Sault Ste. Marie, Michigan and Ontario, this long-sought project took a major step forward. The retainer was arranged by the Ontario Department of Highways and the Michigan State Highway Department, which are handling the preliminary costs and have agreed to construct the approaches for the project. Since then the Sault Ste. Marie, Ont., City Council has legally established its local approach site and is revising its traffic planning in the area.

Recent completion of the Mackinac Bridge 50 miles to the south and construction by the Ontario Department of Highways of a new scenic highway, which is expected to become a major tourist attraction (from Canada's Sault City north and westward around Lake Superior to Fort William), have expanded the local pressure for the crossing into a state and province matter.

The two basic agencies involved are Michigan's International Bridge Authority, originally created in 1935 to study the feasibility of a St. Mary's toll crossing and to build it in the event studies justified it, and the St. Mary's River Bridge Co., Ltd., a Canadian body formed some six years ago to conduct Canadian arrangements and whose life recently was extended. Present plans are for Michigan to build the American and the Province of Ontario the Canadian approaches, while the International Bridge Authority, through agreement with its Canadian counterpart, would conduct the revenue bond financing of the bridge itself and construction. New legislation is expected in Michigan to provide specifically for the freeing of the bridge once revenue bonds have been paid off, in order to make Michigan approaches eligible for Federal Aid under the Interstate highway program. Canadian authorities have said they would like to have tolls collected indefinitely on the crossing in order to provide maintenance, but have expressed themselves willing to yield the point in order to get the project started.

An arrangement was made with Dr. D. B. Steinman last year by the International Bridge Authority for design of the St. Mary's crossing. The plan is to span the river immediately above the Soo Locks. The bridge and its approaches would be 10,730 feet long, with 125 feet of clearance over the four U. S. Locks and 90 feet over the Canadian Lock. Early estimates set the cost of the proposed bridge at $11,000,000, with $3,000,000 for American and $2,500,000 for Canadian approaches and $5,500,000 for the actual water crossing. Traffic studies indicate only a minimum feasibility for financing the entire project by toll revenue but with the approach costs paid by others feasibility of the remainder

1958

WHO'S WHO

in

WORLD POETRY DAY

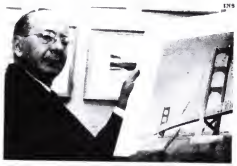
DAVID B. STEINMAN, Bridge Engineer and Poet—400 bridges on five continents, including the world's largest. Author 20 books and 600 professional papers. Four college degrees and 19 honorary ones.

Architectural Forum / August 1958

People

STEINMAN'S BRIDGES

David B. Steinman, 72, builder of some 400 bridges around the world, took time from designing a bridge to span Turkey's Bosporus to watch the dedication of his most ambitious effort so far—the 5-mile-long, $100-million Mackinac Straits Bridge, the longest and most expensive suspension bridge in the world. Although the bridge was first opened to traffic last fall, its dedication was held off until the start of the



STEINMAN AND MESSINA STRAIT BRIDGE

tourist season, with its influx of vacationers into Michigan's Upper Peninsula. For Steinman, it was a significant event, a triumph for his theories of building "rigid" suspension spans instead of "flexible" spans, such as had been advocated by other engineers for years. (The flexible idea suffered a major setback in 1940, when the bridge spanning the Tacoma, Washington, Narrows twisted and vibrated to destruction in a windstorm.)

Recently Steinman, who directs the building of some $2 million of bridges a year from his Manhattan headquarters, has spent most of his time designing the Bosporus span which would have a 2,214 foot center span, sixth largest suspension span in the world. (First is Golden Gate Bridge, with a center span of 4,200 feet. Mackinac Bridge has a center suspension span of only 3,800 feet, but gains its title as the world's longest over-all span by reason of the long reach of roadways on either side of the suspension section.)

Steinman still has bridge-builder's dreams, and would eclipse all his previous efforts with a plan to bridge the Strait of Messina, between Italy and Sicily, with a bridge having a 5,000 foot center span. So far, this is just in the talking stage, but Steinman, who already has seen many dreams materialize, hopes to see it built.

the
MAGNIFICAT

Recipe

D. B. STEINMAN

When fortune frowns upon my lot.
As though I were the sport of fate,
And men about me scheme and plot.
And scorn and persecute and hate —

When, sorely harassed and perplexed,
I seek for solace and release,
But still am troubled, grieved and vexed.
And still without the longed-for peace —

I turn to One who, long ago,
Showed us the way with but a word
(A word that hardly ever now
Among our scientists is heard).
His cup I drink, His hope I share.
His sacrifice and cross I bear,
And hear again His gentle plea
Along the shore of Galilee.

LOYOLA UNIVERSITY

REPORT OF THE PRESIDENT OF LOYOLA UNIVERSITY TO THE CITIZENS BOARD
Given at the Chicago Club, Tuesday, October 7, 1958

Intellectual and Professional Activities

Throughout the 88 years of its existence, Loyola has been conscious of its obligation as a cultural center to offer intellectually stimulating programs to its own students and to the community. This past year was no exception. Once again, through the generosity of Doctor David B. Steinman, the architect of the new Mackinac Bridge, we were able to bring to Chicago six distinguished British and American poets for a Visiting Poets Lecture Series. This most recent series featured W. H. Auden, Marianne Moore and Chicago's own Pulitzer Prize winner, Gwendolyn Brooks.

An indication of the intense interest evidenced in this series is the fact that the demand for tickets for the lectures usually outran the capacity for our downtown campus facilities.

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NEW YORK Herald Tribune

ENGINEERS' NEWS SUPPLEMENT

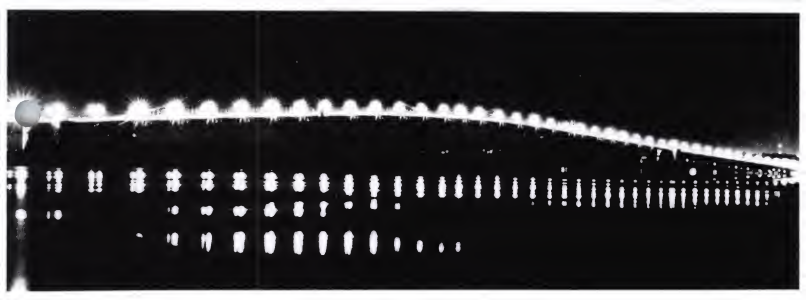
A Monthly Digest of Current Developments in the Field of Science and Engineering

© 1958, New York Herald Tribune Inc.

SUNDAY, NOVEMBER 23, 1958

Setting cable by compressing the strands near top of the south tower of the Mackinac Bridge.

The Bridge That Couldn't Be Built



'BIG MAC' SHINES

X-TG140
.S8

World's longest suspension bridge lighted for night safety, comfort

The world's longest suspension bridge, connecting the upper and lower peninsulas of Michigan across the Straits of Mackinac, is also among the world's best lighted.

Opened to traffic late last year, the Mackinac Bridge is five miles (26,372 feet) long, making it the longest suspension bridge in the world. Actual length of the main span between two 552-foot towers is 3,800 feet, second only to the Golden Gate Bridge. The bridge carries a 48-foot roadway, accommodating four lanes of traffic separated by a mall.

The beautiful, all-weather bridge supplanted a ferry service and cut crossing time for motorists from 53 minutes (exclusive of waiting time and bad-weather delays) to only 10 minutes—while greatly increasing comfort and safety.

To maintain that comfort and safety at night, "Big Mac" is lighted by 248 modern General Electric Form 400 mercury-vapor luminaires, mounted 30 feet high and spaced no more than 160 feet apart. Lighting is provided for approaches, the bridge itself, and the toll plaza.

General Electric also supplied ballasts, constant-current and distribution transformers, circuit breakers, and fuse cutouts for the lighting system. The Edison Sault Electric Company supplies 590 kw for the north side of the system, while an additional 180 kw for the south half is furnished by the Consumers Power Company.

Newspapers, businessmen, and the public had long advocated a bridge or tunnel connecting the peninsulas, but it was not until 1954 that bonds were sold to finance the project. Construction began in May 1954, and the bridge opened November 1, 1957, at a cost of more than $80-million.

At midspan, this modern engineering marvel is 155 feet above the water, allowing ample clearance for even the largest Great Lakes ships. The 552-foot towers extend another 210 feet below the water.

ESCANABA DAILY PRESS
★ ★ ★ (Serving Upper Peninsula's Leading Trade Area) ★ ★ ★
ESCANABA, MICHIGAN MONDAY, SEPTEMBER 22, 1958

Steinman To Design Bridge In Pakistan

The government of Pakistan has retained Dr. D. B. Steinman, internationally eminent bridge engineer, to design a new bridge to carry railroad and highway over the Indus River between Rohri and Sukkur, about 260 miles northeast of Karachi. The main span will be 850 feet. Dr. Steinman will investigate the arch, continuous, and suspension types for this crossing.

The new bridge will replace the old Lansdowne cantilever bridge of 820 feet main span, carrying a single railway track. built fifty years ago from the plans of the British engineer, Sir A. M. Aendel, for the Indian Government.

Dr. Steinman, who recently completed the $100,000,000 Mackinac Bridge, is currently engaged on the design and construction of bridges in Iraq and Turkey, in addition to this new engagement in Pakistan, also three new international bridges between the United States and Canada. His professional record has covered 440 bridges on five continents.

New York Construction News

Grand Central Terminal Building New York 17, N. Y.

Vol. VI, No. 11 NEW YORK - NEW JERSEY METROPOLITAN AREA Monday, October 6, 1958

Pakistan Govt. Names Steinman On Bridge

The Government of Pakistan has retained Dr. D. B. Steinman, bridge engineer, to design a new bridge to carry railroad and highway over the Indus River between Rohri and Sukkur, about 260 miles northeast of Karachi. The main span will be 850 feet. Dr. Steinman will investigate the arch, continuous, and suspension types for this crossing.

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.S8

NEW YORK
Professional Engineer

September - October 1958 • Vol. 15 - No. 5

BOOKS . . . for your Engineering Library

Bridges and Their Builders

By David B. Steinman and S. R. Watson. Contains 401 pages, 5⅜ x 8, 23 photos, 26 drawings. Paperbound, $1.95. Published by Dover Publications, Inc., 290 Broadway, New York 10, N. Y.

Bridge-science from the earliest times to the present is covered in this works. It tells about the ideas behind bridge engineering, the men who built bridges, the special difficulties each overcame, and the history of great bridges throughout the world. The authors explain in everyday terms the problems of stress, aerodynamic flow, supports, braces, eyebar chains, rocker towers and similar matters.

S8

Traveling derricks set 108-ft length of closing steel in 387-ft record-breaking plate-girder span. This structure over Quinnipiac River carries six lanes of Turnpike traffic.

LONGEST PLATE-GIRDER SPAN in Western Hemisphere carries Turnpike through New Haven

R. M. BOYNTON, Associate Engineer with D. B. Steinman, Consulting Engineer, New York, N. Y.

The Quinnipiac River Bridge at New Haven, with its central three-span continuous plate-girder unit, is the largest structure on the 129-mile half-billion dollar Connecticut Turnpike. Its span lengths are 258, 387 and 258 ft, the center span being the longest for this type of construction in the Western Hemisphere. The previous record of 375 ft was held jointly by two bridges on the New Jersey Turnpike, those over the Hackensack and Passaic Rivers.

The record-breaking span crosses the Quinnipiac River at its confluence with the Mill River only 375 ft upstream from the existing Tomlinson Bridge which carries the Boston Post Road, Route U.S. 1. The waterway is only 125 ft wide between fenders at the Tomlinson Bridge, beyond which there is a sharp turn to the right for boats going up the Quinnipiac and an even sharper turn to the left for those going up the Mill River. Provision for safe navigation through this funnel required the span length of 387 ft for the Quinnipiac Bridge. Additional dredging was required at the head of the "Y" formed by the two rivers. This provided a turning basin and obviated the need for an even longer and more expensive bridge at this crossing.

The major structure over the Quinnipiac River, carrying the six lanes of Turnpike traffic, is nine-tenths of a mile long. This includes the record-breaking three-span continuous unit 903 ft long; 2,541 ft of simple-span girders varying from 125 to 175 ft in span length; and 1,290 ft of simple-beam spans varying in length from 57 to 93 ft. In addition, the west end of the structure is widened at two locations to accommodate ramp structures of simple-beam construction. At the east abutment, the roadway is widened to 120 ft to provide access and exit ramps to city streets.

Section 17 of the Connecticut Turnpike, which is located within downtown New Haven, includes in its 1.48-mile length a triple interchange for three major highways as well as the major bridge over the Quinnipiac River. There are also seven individual grade-separation structures of three or four spans each (simple-beam type) varying in length between 40 and 109 ft.

X-TG 140
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The Mining Journal
UPPER • MICHIGAN'S LARGEST • DAILY

Marquette, Mich. — February 16, 1960

Steinman Bridge To Be Built Across Bosphorus, Turks Say

The first suspension bridge to link two continents is being built across the Bosphorus in Istanbul, according to the Turkish government information service.

Contractors have been invited to submit statements of their qualifications to construct the high-level intercontinental bridge between Europe and Asia that will be the largest in continental Europe and the fourth longest in the world. The plans were prepared by the consulting engineering firm of D. B. Steinman of New York City, builders of the Mackinac Bridge.

The bridge will have a between-towers central span of 3,091 feet and two spans on either side measuring 681 feet each, for a total length of 4,453 feet. It will link Ortakoy on the European side of the Bosphorus and Beylerbeyi on the Asiatic shore, an over-water distance of 3,478 feet. Its deck will accommodate four lanes of traffic and two sidewalks, with a vertical clearance of 164 feet for shipping. At the moment traffic across the straits is by passenger and car ferries which can no longer cope with the enormously increased vehicular traffic.

The estimated cost of the Bosphorus bridge is 442 34 million Turkish lira (about 49 million dollars), including interest on financing. This is to be amortized through the collection of tolls. Construction is expected to take about four years.

X-TG-14
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Wisconsin Poetry Magazine

Vol. III July — August, 1958 No. VI

OJIBWA LEGEND

By the falls of Tahkamennon,
Frostbound in the silent moonlight,
Sat an old chief in his wigwam,
White-haired warrior, battle-weary,
Huddled in a snowy blanket.
With his strength now swiftly fading,
He recalled his feats of prowess,
Boasted of his former magic.

"When I blew my breath upon them,
Streams and waterfalls stopped flowing,
Turned to ice of stony hardness.
When I shook my locks, the snow fell,
Covered forest land and prairie;
Birds flew south and beasts found burrows.
None so mightly as Pebowan,
Wielder of the blasts of winter."

Came a young brave to the wigwam,
Fair of face and manner godlike.
Thus he spoke with voice like music:
"When I come the earth awakens;
Flowers spring up at my whisper;
My soft breath unlocks the waters,
Spreads blue skies and April glory,
Calls the birds back from the southland.

"At my nod fall gentle showers,
Bathing vale and hill with freshness,
Giving life to leaf and blossom;
With my song the land rejoices.
Let me dwell here; I am Seegwun,
Spirit of rebirth and gladness."

* * *

Dawnlight found the frost-king vanished,
By the spell of springtime banished.

— *David B. Steinman*

X-TG140
S8

KALEIDOGRAPH

SECOND QUARTER, 1958

MELODY

MOONLIGHT is melody
Gentle as grass;
Sorrow is ebony
Stubborn as brass.

Hope sets the melody
For lover and lass;
But drumbeat of ebony
Shatters the glass.

—D. B. STEINMAN

X-TG 140
Se

Songs of the Open Road

THIS GLADNESS I HAVE KNOWN

I have seen a bluebird on the wing
Above a field in gold and scarlet hue;
A spray of apple blossoms in the spring
In shimmering light against a sky of blue.

I have known the joy of perfect days,
A grassy bank, a stream in jeweled glow;
Then oak and maple leaves in autumn blaze,
And pines in winter, aureoled in snow.

D. B. Steinman

The Blue River Press,
Shelbyville, Indiana.

JUNE 1958

X-TG140 .S8

KÖPRÜLER VE İNSANLAR

Beton ve çelik şairi Dr. Steinman

Dr. D. B. Steinman, Boğaziçi asma köprüsünün projelerini hazırlayan meşhur köprü mühendisidir. Aşağıda okuyacağınız bu yazı, onun hayatı ve şahsıyeti hakkında bir fikir verecek ve büyük bir mühendis olduğu kadar, iyi bir matematikçi, şair ve edebiyatçı olan Dr. Steinman'ın bir portresini çizecektir.

1953 senesi sonunda dünyanın en büyük köprü mühendisinden yılbaşı tebriki almış olan kimseler yalnız hatırda sayıldıkları için değil fakat çok güzel bir kartın kendilerine gönderildiğini görmekle ziyadesiyle memnun oldular D.B Steinman. en son asma köprüsü «Mackinac Straits köprüsü» nün renkli fotografını yollamıştı Tebrik kartının içinde 1160 metre açıklıklı asma köprünün resmi. kapağın dışında ise şu ibareler yazılıydı (1)

KÖPRÜNÜN ŞARKISI

Alçalıp yükselen suların üzerinden aşarak rüzgârın dalgaları oksadığı yerde duruyorum

İnsanları saadete götürecek o alâimisema yolunun yükünü ben taşıyorum

D. B Steinman

Dünyanın en büyük köprü mühendislerinden biri olan Dr Davad Barnard Steinman'ın hayatı tıpkı bir köprü gibidir Beton ve çelikle meydana getirdiği eserlerindeki güzelliği yazdığı şiirlere aksettirerek beton ve çeliğin şairi olmuştur

Bugün 71 yaşında olan Dr Steinman dünyada nadir kimselerin nail olduğu bir başarı ile mazi ve istikbale bakmaktadır

400 e yakın köprüsü dünyanın her kıtasında (Afrika hariç) yolları kıtaları birbirine bağlamakta nehirleri aşmakta nakil vasıtalarını taşımaktadır (2) Amerikadaki Waldo - Hancock. St Johns. Triborough. Almanyadaki Köln - Mühlheim. Avustralyadaki Sydney Harbor. Brezilyadaki Florianapolis. Kanadadaki Grand Mere köprülerinin projelerini Steinman yapmıştır Michigan'da Mackinac Boğazında 100 milyon dolarlık asma köprüsünün açılış merasiminden sonra İstanbul Boğaziçi köprüsünün hesaplarına başlamıştır Diğer taraftan Dicle üzerinde çirkin köprüler görmekten usanmış Irak hükûmeti Bağdatta yapılacak asma köprünün

ÇOCUKLUK VE GENÇLİĞİ

Amerikaya hicret etmiş bir çiftçi ailesinin yedi çocuğundan biri olan David Steinman. Brooklyn köprüsünün gölgesinde fakir ve köhne bir evde büyüdü. Brooklyn köprüsü 1883 te hizmete girmişti: David ise üç sene sonra dünyaya geldi «Köprüler Kraliçesi» diye ad taktığı bu yapının yanında oynarken bir gün kendisinin de böyle büyük eserler yapacağına ahdetmiştir Bir yandan tahsilini gece dersleri veren bir lisede bitirirken on üç yaşında iken temin ettiği bir bursla City College'e girmeye muvaffak oldu Daha yirmi yaşına basmadan Columbia Üniversitesinde üç ayrı mevzuda diploma alabilecek şekilde çalışıyordu 1909 da inşaat mühendisi olarak mezun olurken diploma projesi olarak Henry Hudson köprüsünün projesini yapmıştı aldığı not 100 üzerine 100 dü O zaman 22 yaşında idi Otomobilin tekâmülü ile New York ve civarında büyük ve geniş yollar inşası bahis mevzuu olunca Henry Hudson köprüsü nihayet inşa edildi Genç mühendisin diploma projesi yirmi beş sene sonra tatbik mevkiine (ve aynen) konulmuştu.

Dr. Danid B. Steinman

Columbia'yı bitirdikten sonra Steinman on iki sene kadar metro ve köprü inşaatlarında çalıştı Bir ara İdaho üniversitesinde ders verdi New York'taki müşavir mühendislerinden Gustav Lindenthal'ın davetine icabet ederek Hell Gate ve Sciotoville köprülerinin projelerinin hazırlanmasına yardım etti (1914) o artık serbest hayata atılmak istiyordu 1920 de işleri kesatti Amerika bir buhran geçiriyordu Bir yazıhanede aylığı 10 dolara bir masa kiraadı. ilk ay hiç bir şey kazanmadı: ikinci ay 5 dolar, üçüncü ay ise 250 dolar temin etti, nihayet beşinci ay bir teknik rapor hazırladığından ve kırk kadar demiryolu köprüsünün kontrolunu yaptığından cebine 400 dolar girdi.

İLK MÜSABAKA - BİRİNCİLİK

New York limanında Manhattan adasını karşı sahile bağlıyan Brooklyn köprüsünden başka iki asma köprü daha vardır Williamsburg ve Manhattan köprüleri Bu son iki köprüyü inşa etmiş olan Holton D Robinson adında bir mühendis bir gün Steinman'a gelerek beraberce bir Milletlerarası müsabakaya girmeerini teklif etti Mevzuu şu idi: Brezilyada Florianopoliste bir asma köprü projesi İki meslekdaşın teklifleri güzellik bakımından birinci seçilmekle kalmadı fakat aynı zamanda diğer tekliflere nazaran üçte iki çelik kullanıyor ve mukavemet dört misli fazla oluyordu.

KÖPRÜDE GÜZELLİK VE MATEMATİK

Bunu müteakip senelerde Steinman'ın köprüleri limanlarda, körfezlerde, nehirler üzerinde kendini göstermeye başladı. Sağlamlık kadar güzellik de mühendislik yapılarında yer almalıdır. Diyordu.

Steinman matematikçi olarak asma köprülerin «aerodinamik» muvazenesi problemi üzerinde senelerce araştırma yaptı. 1940 da Tacoma Narrows köprüsünün bir rüzgâr neticesinde yıkılmasından iki yıl kadar önce Steinman asma köprülerin rüzgârların tesirine karşı iyi olmasının icap ettiğini ve sallanmaya meydan verilmemesi için gereken tedbirlerin alınmasının faydalı olacağını belirtti Mukavvadan modeller yaptığı gibi rüzgâr temellerinde pahalıya mal olan tecrübelere girişti.

Her asma köprü için tehlikeli olan bir rüzgâr hızı vardır, bu kritik hız normal olarak meselâ saatte 30 - 50 millik bir hızdır' Dr. Steinman, yol döşemesi ile köprünün kenarları arasında muayyen bir mesafe bırakarak kritik hızın 40 milden 600 mile yükselebileceğini isbat etti. en şiddetli kasırgalarda bile saatte 130 mili geçmez Mackinac köprüsünde daha da ileri giderek sonsuz hızda bir rüzgâra karşı köprünün mukavemet edebileceğini isbat etmiştir.

Steinman'ın 17 senelik matematik araştırmaları köprü mühendisliğinde yeni merhaleler açmıştır. Elde ettiği neticeler daha iktisadi, daha emin, daha uzun, daha güzel köprülerin inşasını mümkün kılmaktadır.

Dr Steinman'ın matbu eserleri hakkında bir fikir vermek için bunların inşa ettiği eserlerle varis ettiklerini söylemek kâfidir

Neşriyatı meyanında asma köprülerin hesap ve inşası, dünyanın meşhur köprüleri, Bir köprü inşa ettim ve diğer şiirler, gibi kitaplar ve 600 e yakın teknik makale sayılabilir: ayrıca sekiz ansiklopedinin yazı heyetinde yer almıştır. 22 Akademik unvanı vardır

Dr David B Steinman mühendis. âlim. artist. mucid. terbiyeci. konferansçı muharrir şair ve beşeriyet muhibbi bir insan olarak bu vasıfların her birini lâyıkiyle haketmiştir Yazdığı ve inşa ettiği eserlerle ve yaptığı araştırmalarla mühendisliğe ve medeniyete baha biçilmez faydası dokunmuştur.

X-TG 140
.S8

CONSTRUCTION
20 LOFTUS STREET, SYDNEY
THE MASTER BUILDERS' WEEKLY
MAY 7, 1958.

Book Review

"Bridges And Their Builders," by David Steinman and Sara R. Watson. Produced by Dover Publications Inc., New York. Price, 1.95 dollars, U.S.A.

This book will attract attention by reason of the fame of the principal author, Dr. David B. Steinman, as a foremost bridge builder of the century. He needs no introduction even to those not intimately associated with bridge building.

In relating this story of man's conquest of Nature, a commencement is made with the work of Nature herself by placing the first example of bridges in rock for man to copy. In graphic style the authors' review of man's endeavour to triumph, and to express in that triumph a concept of the fulfilment of a vision in so doing. This attitude, so ably expressed, is no less evidenced in the career of the author David B. Steinman himself. He is a philosophic artist and a poet as well as a bridge builder.

Numerous examples of magnificent engineering works accompany man's history from prehistoric days, although by to-day's standards they are primitive, but these primitive men developed the arch, a discovery which reached its peak in the bridges of the Romans, many examples of which are to be found in Europe to-day.

The authors go on to review the development of bridge building and survey the introduction of the elements of science into design and engineering construction.

It is not possible for this review to mention the many interesting examples or the gems of literary art in their treatment which run through this book. It is worth reading for this alone.

In the second and third parts of the book the development of bridge techniques is reviewed by illustration and description. Personal mention is made of the now famous designers of each, in Europe as well as America. These parts lead up to the beginning of the twentieth century with three classical illustrations — The Eads "St. Louis Bridge" of 1874; Roebling's "Brooklyn Bridge" of 1883, and Sir Benjamin Baker's "Firth of Forth Bridge" of 1890. Each one of these is an epic on its own, but paves the way to further achievements in a new era of bridge building.

Part Four then carries on with modern techniques, placing bridge building in contemporary civilisation as one of man's greatest achievements.

In this story the works of the author, David B. Steinman, are also mentioned, not over prominently but with evident pride well deserved. Probably the greatest achievement in suspension bridge history is the recently completed Mackinac Bridge, which culminates the glorious history of progress to-day. It places the bridge builder as a leader of mankind. Certainly he is the pathfinder over difficulties placed in man's progress over the land.

Again, this book is recommended for quiet, pleasurable reading and contemplation.

The contents of the book are summarised under chapter numbers: 1, The beginning of bridge building; 2, Primitive bridge building; 3, Roman bridge builders and bridges; 4, The brotherhood of bridge builders; 5, The Renaissance; 6, Eighteenth century: Age of reason; 7, Timber spans and covered bridges; 8, Iron bridges; 9, Steel and mathematics: 10, J. B. Eads and the St. Louis Bridge; 11, The Roeblings and the Brooklyn Bridge; 12, The Firth of Forth Bridge; 13, Man-made masonry; 14, Great steel arches; 15, Great steel cantilevers; 16, Great suspension bridges; 17, Great truss and girder bridges; 18, The bridge builder in contemporary civilisation.

X-TQ 140
.S8

the fiddlehead

SPRING, 1958 NUMBER 36

Blueprint

He saw it clearly and clairvoyant bright:
Twin granite pylons of majestic rise,
Founded on rock beneath the water swirl;
The lofty cables, spun of cold-drawn steel,
Cutting the sky in parabolic arcs —
A lyric pattern etched against the blue.

The spell of Euclid sang in his design:
The wizardry of radiating stays,
A geometric web to hold the stars;
The titan uplift of the singing strands;
High Gothic portals framed in stone — all these
He traced in blueprint, accurate as truth.

This magic he had made, though in the end
He did not live to see the caissons down.
The shadow of a fear that builders know
Was myth made real: 'A bridge demands a life.'
He paid the toll, the world his legatee:
His work, his dream, bridging the span of death.

D. B. STEINMAN

X-TG 140
S8

MIDWEST CHAPARRAL

1957
FALL—1958—WINTER

TIME IS A RIVER

By D. B. STEINMAN

Time is a river flowing relentlessly
From undivinable springs and chartless source
To final fusion in a boundless sea,
And none can stay or speed its headlong course.
Life is a ship afloat upon the stream
Bearing a mortal through the instant now
Toward bournes and aeons of the ultimate dream.
Life is a galleon with golden prow.

When favoring winds take up the forward slack,
The panoramic sleight shows quickened pace;
But when a headwind holds the journey back,
Then time seems halted in its onward race.
Impatient of the tide's restraining bond,
Man's spirit soars to glimpse the goal beyond.

X-TG 140
S 6

31st Year of Monthly Publication

Science of Mind

A Practical Guide to Fuller, Richer Living

Volume 31, No. 7 ☆ ☆ ☆ July, 1958

A famous engineer and builder of bridges feels that the wonderful future that lies ahead for man can only be reached by means of a spiritual "bridge."

Thinking for the Atomic Age

David Barnard Steinman

On August 6, 1945, when the report of an atomic blast over Hiroshima was flashed around the globe, civilization was shaken to its utmost foundations. Individual reactions varied, from "I am scared to death," to "Father, forgive them for they know not what they do." On the whole, the impact was sobering. Men realized that, in one brief moment, the history of the world had been changed. For better or worse, the story of mankind has entered a new and fateful chapter.

Perhaps the fear and the soul-searching it induces are hopeful signs. Many more people now sense the need of Divine guidance, of a moral compass to steer by, if only because they realize that a single blundering act may prove fatal to our civilization, if not to the continuance of the race of man.

The realization grows upon us

D. B. Steinman is an internationally distinguished bridge engineer and has been connected with the erection of over four hundred bridges on five continents. He is the recipient of many honors and awards. This article is based on his Commencement Address at the University of Tampa in June of 1957.

X-TG 140
S8
#10

THÜRINGER Tageblatt

ORGAN DER CHRISTLICH-DEMOKRATISCHEN UNION

Heiligenstadt/Worbis, Dienstag, den 17. Juni 1958

Ein Mühlhäuser wird weltberühmt

David B. Steinman: Brücken für die Ewigkeit, Das Leben von Johann Roebling und seinem Sohn, Düsseldorf 1957, Werner-Verlag GmbH.

Genau vor drei Jahren (vgl. TT Nr. 99 vom 27. 5. 1955), wurde von uns über Johann August Röbling, den kühnen Brückenbauer, berichtet. In Mühlhausen wurde er am 12. 6. 1806 geboren, in Trenton starb er am 22. 7. 1869 an den Folgen eines Unfalles, den er beim Bau der damals größten (Brooklyn-) Brücke erlitt.

Nun hat sich D. B. Steinman, geboren am 11. 6. 1886 in New York City, „der berühmteste Brückenbauer unserer Tage, der im Schatten der Brooklyn-Bridge aufwuchs", der Mühe unterzogen, Leben und Werk unseres berühmten Landsmannes auf rund 400 Seiten aufzuzeigen. Wie er das tat, ist so spannend und interessant, daß wohl kein Leser das Buch vorzeitig aus der Hand legen wird. Mit besonderer Liebe und mit farbigem Kolorit schildert Steinman die alte Reichsstadt, das Elternhaus, den Vater, die Mutter, Johann Augusts Sturm- und Drangjahre, seinen unaufhaltsamen Aufstieg, sein Ende. Ueber einige kleine Differenzen wird man gern hinwegsehen (so z. B. wenn er schreibt daß 1707 J. S. Bach in der Divi-Blasii-Kirche getraut wurde diese Trauung fand bekanntlich in Dornheim statt). Man möge bedenken, daß dem Autor von der Familie Roebling (durch Johann Augusts Urenkel Joseph M.) „in großzügiger Weise reiches Quellenmaterial anvertraut" wurde, es war „ein ganzer Koffer voll Originalpapieren und handgeschriebenen Briefen, von denen viele mehr als hundert Jahre alt sind". Wir dürfen ferner annehmen, daß Steinman kaum persönlich in Mühlhausen gewesen haben wird. Was der Verfasser selbst aussagt, dürfte jede weitere Kritik an seinem Buch verbieten: „Da die Brooklyn-Brücke und die Geschichte ihrer Erbauer mich schon in meiner Jugend begeisterte, habe ich fünf Jahre meines beruflichen Lebens darangegeben, dieses Buch zu schreiben. Es sollte ein Werk dankbarer Liebe werden, mit der ich die Dankesschuld für diese Begeisterung begleiche. Ich hoffe, daß dieses Buch durch seine deutsche Ausgabe dazu beitragen wird, als Brücke der Freundschaft zu dienen — eine Brücke internationaler Verständigung, des Friedens und des guten Willens."

Die deutsche Uebersetzung besorgte Walther Schwendfeger. Hier kurze Biographie Steinmans: 1886 in New York City geboren, seine Vorfahren waren Deutsche, seine Frau ist Oesterreicherin. An über 370 Brücken in allen Erdteilen konstruktiv beteiligt, besitzt er 19 akademische Grade (4 selbsterworbene, 15 „honoris causa"). Plant Riesenbrücke zwischen Italien und Sizilien über Straße von Messina, die Rekordentfernte von 1½ Kilometern haben wird! Ueber Steinman schreibt sein Uebersetzer: „... Ingenieur und Gelehrter Mathematiker und Künstler, Erfinder und Lehrer, Brückenbauer und Dichter, und über allem — ein großer Mensch."

X-TG140
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JUNE, 1958

ARGOSY

New four-lane bridge bisects Straits of Mackinac, is towering monument to its creators.

"THE BRIDGE THAT COULDNT BE BUILT"

She's got a body of concrete and a crown of steel, but if you ask anybody in northern Michigan, he'll tell you she's the most beautiful lady in the Wolverine State. She ought to be; she cost $100,000,000 and five lives

by TED DUTTON

The day Michigan dedicated the Mackinac Bridge, the men who built it got their backs up. It was the fault of the newspapers. Editors kept calling the superlative handiwork of the bridge builders "a triumph of technology." Which was all right, as far as it went. But nobody mentioned manpower.

This was blasphemy. There's virtually *no* automation in bridge-building. None is possible—for you don't mass-produce bridges, and no mere machine can erect spidery steel structures hundreds of feet in the air. Age of push buttons or no, bridges are still built with sweat, blood, and hand tools. Growled veterans of Mackinac, survivors of the hairiest industrial ordeal since the building of the Suez Canal: "Technology, hell! Don't them scissorbills know? Men built the Big Mack, not machines."

At first the whole thing seemed impossible. The Big Mack spans the rough, deep,

A-16140
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THE AMERICAN WAY

A DREAM COME TRUE

By George Peck

On November First in 1957, one of the world's greatest bridges was opened to traffic—in fact, the world's longest suspension bridge —the Mackinac Bridge, so named because it stretches across the broad Straits of Mackinac linking the upper and lower peninsulas of the State of Michigan.

This greatest of great suspension bridges measures 8,614 feet between opposing cable anchorages, which is 2,164 feet longer than the corresponding length of San Francisco's Golden Gate Bridge, and 5,114 feet longer than New York City's George Washington Bridge. Its overall length, including approaches, is 5 miles and 44 feet.

Rising majestically 552 feet above the water level, the twin towers hold aloft the tremendous cables—this is equivalent in height to a 46-story office building which will give readers an idea of just how high these towers reach toward the sky.

The man who designed this magnificent structure is the Dean of American Bridge Builders, having designed and built more and greater bridges than any other American—as a matter of fact, he is recognized universally as the world's greatest bridge builder. He is David B. Steinman, B.S., A.M., C.E., Ph.D., Sc.D.

Now one would naturally figure that Dr. Steinman would be proudest of this latest and biggest bridge engineering achievement. But, such is not the case. This columnist has had the privilege of knowing Dave Steinman for many years, and knows that he looks upon his reconstruction (not the building) of another bridge as his crowning achievement, the high point of an illustrious career. And thereby hangs a tale of how a dream came true.

The structure, the reconstruction job of which was awarded to Dr. Steinman, is the Brooklyn Bridge. Regarding this bridge, he has this to say: "It is no accident that the grand, old Brooklyn Bridge remains the most satisfying aesthetically of all great bridges—because its two builders, father and son, were artists at heart. In 1883, after thirteen years of heart-breaking toil, the great work was finished. . . .

"When the colossal structure was completed it was the engineering achievement of the century—the longest single span ever built, the tallest and strongest, the first to use steel cables. Today there are bigger bridges, but they never could have been built had not Brooklyn Bridge shown the way. And its story is the greatest bridge building story of all.

"The Brooklyn Bridge was conceived, planned and designed as his crowning lifework by the pioneer master-builder, John A. Roebling, who suffered the tragedy of dying from an accident on the final surveys in 1869, before the first stone was laid. The great work was nobly completed by his son, Col. Washington A. Roebling. . . ."

Three years after the Brooklyn Bridge was finished and opened to traffic, in 1886, Dave Steinman was born in New York City and grew up in his earliest years in the Borough of Manhattan near the end of and in the shadow of what was then the world's greatest bridge. As a lad he said to himself, "Some day I'm going to be the builder of a great bridge like that." In a letter written as recently as May 13, 1958, he said to me in part, "This monumental structure inspired me in my ambition to become a builder of bridges."

Well, as we know, Dr. Steinman's ambition has been realized —he has built bridges—beautiful bridges—bigger bridges by far than the Brooklyn Bridge—all over the world. Honors have been conferred upon him by many foreign countries — doctorates by scores of universities. His career is truly a "Horatio Alger" story—one of hard study and work and individual initiative bringing him great honors and giving the world many of its finest bridges.

But in 1950, came what to Dave Steinman was his greatest triumph. After 67 years, Brooklyn Bridge, as he tells it, "had become little more than a majestic monument —not because of any inadequacy of strength but for the simple reason that the traffic needs of the Automobile Age, with more than 50 million motor vehicles on the highways, could not possibly have been foreseen in 1869 when the bridge roadways were planned."

And so Dave Steinman's dream came true. He was given the job of reconstructing, strengthening and modernizing to meet present day traffic needs, the bridge which in his youth had inspired him to become a builder of bridges. It was a tremendous task but in 1953 it was completed. The capacity of the bridge was increased from two lanes to six. Let Dr. David B. Steinman have the last words and here they are:

"I am proud to have my name on bronze tablets on the bridge that inspired me in my youth."

SANTA ANA, CALIF., TUESDAY, JUNE 17, 1958 The Register

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The Republican-News

and ST. IGNACE ENTERPRISE

ST. IGNACE, MICHIGAN, THURSDAY, JULY 17, 1958

STEINMAN BRIDGE TALK IN CONGRESSIONAL RECORD

Through the interest of Congressman Louis C. Rabaut from Michigan, the address given by Dr. David B. Seinman, the engineer, at the Mackinac Bridge dedication on June 28 was printed by unanimous consent in the Congressional Record of June 30. In his speech before the House of Representatives, Congressman Rabaut said:

"Mr. Speaker, when a man can make his work a prayer was brought forcibly to me when I attended the dedication of the Mackinac Bridge on Saturday, June 28, 1958. I listened with awe to the stirring poctical address of Dr. D. B. Steinman, consulting engineer for the bridge. With pride, I place his words in the Record."

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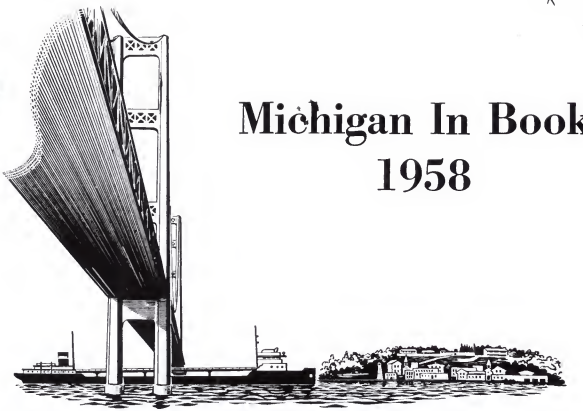

Michigan In Books 1958

Miracle at Mackinac

When Governor and Mrs. Williams paid the first toll and rolled across "Big Mac" November 1, 1957, it marked the fulfillment of a Michigan dream.

"The Bridge can mean a new trade route, a new 'Northwest Passage,' which will run from one end of Michigan to the other," Governor Williams said.

For four years progress of the giant Mackinac Bridge made headlines. Its famous designer, David B. Steinman, not only wrote a poem about the great span—which he regards as the most imaginative and successful bridge of his career—but says of his experiences at Mackinac, "I have more or less set down my roots in your wonderful state and have established ties of brotherhood with the people of Michigan."

The Mackinac area has always been a favorite with writers. This year three novelists—Iola Fuller, Myron Orr and Bill Ratigan—published novels inspired by its story. At this moment of Michigan's great achievement, other new materials featuring the Bridge and its neighborhood are a valuable lead to this record of "Michigan in Books."

Before the Bridge: History and Directory of St. Ignace and Nearby Localities. Kiwanis Club, St. Ignace, Mich. 1957. $3.25.

Brown, Prentiss. *The Mackinac Bridge Story*. Wayne State University Press, 1956. $1.00.

Carver, Jonathan. *Travels Through the Interior Parts of North America, in the Years 1766, 1767, and 1768*. Reprint. Ross and Haines, Minneapolis. 1956. $8.75.

A travel account from the British period of Michigan's history.

"Grand Hotel" by W. Stewart Woodfill, in *Michigan History*, December, 1957. Michigan Historical Commission, Lansing.

Distinguished owner of Mackinac Island's famed Hotel tells its colorful story at 70th anniversary dinner, July 10, 1957.

Steinman, David Barnard. *Miracle Bridge at Mackinac*, in collaboration with the late John T. Nevill. Charcoal drawings by Reynold H. Weidenaar. Eerdmans. 1957. $4.50.

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New York Construction News

Monday, July 21, 1958

Steinman Makes Grant To University

Dr. David B. Steinman, internationally eminent bridge engineer, has made a grant of $10,000 to St. Lawrence University to establish Holton D. Robinson Scholarships for student aid, in memory of his late partner, Dr. Robinson, who was an alumnus of St. Lawrence. The partnership, which began in 1920, lasted 25 years until Dr. Robinson's death in 1945 at the age of 82.

The grant, made from the funds of the David B. Steinman Foundation, specifies that each student recipient of a scholarship be asked to assume a moral obligation to make repayment to the University when he can at any future time so as to help make the scholarship fund self-perpetuating. Dr. Steinman has specified a similar pledge at other institutions where he has established scholarships. The underlying thought is to inculcate the spirit of giving to help successive generations of students. Dr. Steinman calls this "a moral chain-reaction" of obligation and opportunity.

Se

Friday Market

October 1958 | One Shilling | No. 9

D. B. Steinman In a garden long ago

I remember summer roses in a garden long ago;
You were with me, my beloved, in the golden moonlight glow.
A nightingale was singing in the dreamy woodland grove
And all the longing of my heart was in his song of love:
You are sweet, sweet, sweet, my darling,
Oh, my love, I love you so!
The nightingale was singing in a garden long ago.

I remember summer magic, all the sweetness in the air,
The honeysuckles blending with the fragrance of your hair.
The melody of moonlight and the starlight in your eyes
Were mingled with the glory of the stars that filled the skies.
You are sweet, sweet, sweet, my darling,
Oh, my love I love you so!
All the stars were singing in a garden long ago.

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Mackinac Straits Bridge Is Dedicated

Across the Straits of Mackinac, where in 1634 explorer Jean Nicolet paddled his birchbark canoe expecting to find a passage to the Orient, stretches the recently completed five-mile-long Mackinac Bridge. On June 28 this beautiful $100,000,000 suspension bridge, with main span of 3,800 ft, was dedicated to public use. It was designed by D. B. Steinman, M. ASCE, for the Mackinac Bridge Authority. The foundations and piers were built by Merritt-Chapman & Scott, and the steel superstructure was fabricated and erected by the American Bridge Co. An article on design and construction of the structure was published in the May 1956 issue of "Civil Engineering" (page 37-50). The story of the whole bridge project is told in a recent book, "Miracle Bridge at Mackinac," by D. B. Steinman and John T. Nevill, published by the William B. Eerdmans Publishing Co., Grand Rapids, Mich.

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poetry digest

"America's Best-Loved Poetry Magazine"

JULY-AUGUST 1958 Vol.4 No. 5

David B. Steinman

Two poems by D. B. STEINMAN

WHAT HOPE REMAINS

With brains God-given for a higher goal,
What hope remains when man does stupid things
Like wars of carnage that appall the soul
And blast the rock of faith to which it clings.

But here, behold, a work of beauty stands,
A bridge! Defying gravity and space,
It soars above the waves on powerful strands
To arch across the blue in lofty grace.

Seen from above, a battleship appears
Dwarfed like a toy beneath the vaulting span;
This is our triumph over ancient fears,
Our faith renewed in final good of man.

BLUEPRINT

He saw it clearly and clairvoyant bright:
Twin granite pylons of majestic rise,
Founded on rock beneath the water swirl;
The lofty cables, spun of cold-drawn steel,
Cutting the sky in parabolic arcs -
A lyric pattern etched against the blue.

The spell of Euclid sang in his design:
The wizardry of radiating stays,
A geometric web to hold the stars;
The titan uplift of the singing strands;
High Gothic portals framed in stone - all these
He traced in blueprint, accurate as truth.

This magic he had wrought, though in the end
He did not live to see the caissons down.
The shadow of a fear that builders know
Was myth made real: "A bridge demands a life."
He paid the toll, the world his legatee:
His work, his dream, bridging the span of death.

David B. Steinman

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VOLUME XXXII NUMBER 2 SUMMER 1958

Prairie Schooner

Founded by L. C. Wimberly

Sonnet at Seventy

D. B. STEINMAN

Of words, as well, your love leaves me bereft;
Of words that strive most vainly to relate
The wonder of that love, however deft
At symbolizing my novitiate.
So let my silence tell how eloquent
The need of you, though passion be distilled
And life no longer tempest and torment
But sweet serenity of love fulfilled.

Trial and loss and triumph down the years
Have linked us by a thousand memories
Which now, in time's decline, recalled through tears,
Freshen, as with the blowing of a breeze.
A day without you is denial of light:
A pit of loneliness in starless night.

D. B. Steinman, the famous bridge engineer, has built four hundred bridges on five continents, including the world's largest. He is the author of twenty books and six hundred professional papers and is the holder of nineteen honorary degrees. Poetry is a recent avocation, he tells us.

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Wisconsin Poetry Magazine

Founded 1954

Vol. IV | September — October, 1958 | No. 1

FULFILLMENT

(John A. Roebling, 1869)

By fevered travail he had wrung from fate
This chance for which he hungered, to create
Of lasting stone and steel, of strands and beams,
In vaulting majesty, his bridge of dreams.

He saw it clearly in clairvoyant view:
Rising from firm foundations anchored deep,
The granite pylons bold against the blue;
The mighty cables curved in downward sweep
And upward in the arc of perfect law;
The magic pattern of the stays and bars,
A giant web to hold the journeying stars;
A bolder span than mortal ever saw,
Speeding the multitudes in surging flow
Like human tides across the shores below.

But he, whose heart and mind conceived the plan
Was not to see the time-defying towers,
The cables' uplift with titanic powers,
The thankful thousands on the far-flung span.
From ancient times a fearsome legend broods:
"A bridge demands a life!" A sacrifice
To angry river gods who guard the floods.
And here the forfeit was a cruel toll:
At very threshhold of his promised goal,
By mortal hurt the builder paid the price.

The man inspired with passion to be free,
Who bravely fled oppression's iron hand
And found a haven here to build his dream,
Who saw the poetry in sea and sky,
In star and sunset, and in mountain stream,
Whose love for music sang in his design,
Whose love of beauty glowed in every line —
Repaid his debt to his adopted land.
With final breath he left his legacy:
"The Bridge! How beautiful the Bridge will be!"

— *David B. Steinman*

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He's the News

D. B. Steinman Decided His Bridge Career When 7

When David Barnard Steinman was 7 and hawking newspapers in the shadow of the 10-year-old Brooklyn Bridge, he told his chums that someday he'd build a bridge like that—and they laughed.

Today, 65 years later, he has had the last laugh 440 times

★ ★ ★

DAVID B. STEINMAN

★ ★ ★

over — once for each of the bridges he has built — and is still laughing.

—o—

WHAT'S MORE, the very bridge which inspired him now bears a bronze plaque commemorating his reconstruction and strengthening of the span for modern traffic from 1948 to 1953.

Also he may have another laugh in store in the survey of the feasibility of the proposed Liberty Bridge from Jersey City to Brooklyn, which he is about to undertake for Hudson and Union Counties.

For the projected Narrows Bridge from Brooklyn to Staten Island which Liberty Bridge supporters oppose was called "The Liberty Bridge" by Steinman when he first began planning it in 1925.

—o—

STEINMAN said he even made the presentation before the War Department 10 years ago to get permission to construct the span, and then New York City's Robert Moses—who preferred the Narrows Bridge name—"gave the job to someone else."

Projects currently under construction by Steinman are a bridge over the Tigris River in Baghdad, Iraq, and another over the Bosporus between European and Asiatic Turkey.

Bridges on five continents bear the imprint of the 5-foot-8 inch Steinman, who bosses 350 engineers on the 10th and 11th floor offices of his firm at 117 Liberty St., in Manhattan. The walls of the executive offices are covered with medals, plaques and scrolls honoring his contributions.

—o—

ENGINEERING bibliographies list his as the author of 20 books and 600 professional papers. Since his graduation summa cum laude in 1906 from New York's City College and award of his Masters in 1909 and Ph.D. in 1911 at Columbia University, he has taught and built uninterruptedly.

"Who's Who" notes he was born in New York City June 11, 1886, the son of factory laborer Louis Kelvin and Eva Scollard Steinman. It records his marriage June 9, 1915, to Irene Hoffman who lives with him at 305 Riverside Dr., New York City, and still accompanies him abroad on jobs.

Jersey Journal, Jersey City, Wed., Aug. 20, 1958

REVISTA DO
CLUBE de ENGENHARIA

ENGENHARIA EDITORA S. A.

AV. RIO BRANCO, 124 — RIO

DEC 12 1958

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PONTES DE GRANDES VÃOS

D. B. STEINMAN
Engenheiro Consultor
Tradução de Amália Machado da Costa

X-TG140
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NEW YORK
Herald Tribune
SUNDAY, JULY 27, 1958

Week of Verse

Melody

(From Kaleidograph)

MOONLIGHT is melody
Gentle as grass;
Sorrow is ebony
Stubborn as brass.

Hope sets the melody
For lover and lass;
But drumbeat of ebony
Shatters the glass.

D. B. STEINMAN

MICHIGAN ARCHITECT AND ENGINEER

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JUNE
1958

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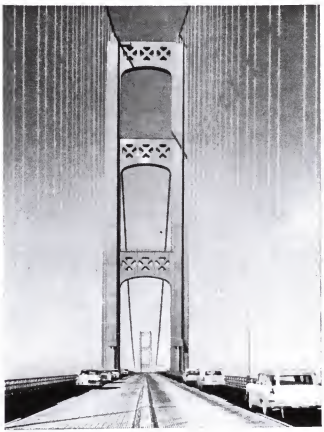
ELECTRO NEWS of MICHIGAN

DR. DAVID B. STEINMAN

An Engineered Masterpiece



LOOKING TO THE NORTH ACROSS
THE BIG BRIDGE

OUR 40TH YEAR

X-TG 140
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WRITER'S NOTES & QUOTES

EARTHBOUND
--D. B. Steinman

Bards who pen verses more shocking than lyrical,
Why flaunt your rejection of powers unknown?
Belying the mystery, denying the miracle
Of life transcending the flesh and bone.

Lit from afar and within by the noumenal,
Glimpsing the wings of the wise and victorious,
Yet fettered by gyves of the merely phenomenal,
You grovel on earth, abject and inglorious.

June 1958

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Watertown Daily Times

WATERTOWN, N. Y., WEDNESDAY AFTERNOON, JULY 16, 1958

$10,000 Scholarship Fund Given S. L. U.

Canton, July 16. — Dr. David B. Steinman, internationally eminent bridge engineer, has made a grant of $10,000 to St. Lawrence university to establish Holton D. Robinson scholarships for student aid in memory of his late partner, Dr. Robinson who was an 1886 graduate of St. Lawrence university. The partnership, which began in 1920, lasted 25 years until Dr. Robinson's death in 1945 at the age of 82.

The grant, made from the funds of David B. Steinman foundation, specifies that each student recipient of a scholarship be asked to assume a moral obligation to make repayment to the university when he can at any future time so as to help make the scholarship fund self-perpetuating. Dr. Steinman has specified a similar pledge at other institutions where he has established scholarships. The underlying thought is to inculcate the spirit of giving to help successive generations of students. Dr. Steinman calls this "a moral chain-reaction" of obligation and opportunity.

Recalling his life-long indebtedness for scholarships and fellowships that made his own professional education possible, Dr. Steinman has repaid those debts a hundredfold and, in addition, has made grants to a long string of educational institutions. Some of these scholarship funds he has established in honor of friends and loved ones. At Manhattan college he established the Arthur V. Sheridan Scholarship fund in memory of Dr. Sheridan, a friend and co-worker in professional causes. At Hunter college, he established the Irene H. Steinman Scholarship fund in honor of his wife. At the University of Florida, an Irene H. Steinman fund has been established for student aid. To date, he Setinman has made grants to more than 30 educational institutions, in an aggregate amount exceeding $400,000.

Last year Dr. Steinman made a grant of $1,500 to St. Lawrence university to finance the David B. Steinman Festival of the Arts. He has agreed to provide funds for a similar program during the 1958-59 school year.

Dr. Steinman was honored by the university at the spring commencement June 8, at which time he was awarded an honorary doctor of humane letters degree for his contribution to the humanities.

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Dr. Steinman's most recent achievement: the mighty Mackinac Bridge in Michigan. Here were erected 552-foot towers which reach down into gorges 210 feet below the water and which stand 3,800 feet apart. And here 42,000 miles of wire were strung to form the cables from which hangs the 6,600-ton roadway.

A self-anchored suspension bridge, proposed by Dr. Steinman, for spanning the Tigris River in Baghdad, Iraq, has been selected by the Ministry of Development from comparative designs of five different types of structure submitted by Dr. Steinman in his preliminary report. The selection of the suspension design, shown below, was based on its inherent grace and beauty at a location near the King's Palace where maximum aesthetic appearance was the governing consideration.

Horizons in Engineering

By

DR. DAVID B. STEINMAN, P. E.,

Consulting Engineer and First President, National Society of Professional Engineers

HORIZONS are not boundaries. The future of engineering is unbounded. There is no limit to future progress and achievement.

The horizon is merely the line of tangency circumscribing that which is immediately visible. There are always much vaster areas beyond the horizon. The opportunities for future discoveries and inventions are unlimited.

The one assured fact is that horizons are ever expanding. As we scale new heights, new and greater horizons come into view.

When we stand on the seashore, our horizon is a circle of three miles radius. When we ascend to the top of the Empire State Building, our horizon is enlarged to a radius of forty-one miles. The area of our field of view is increased two-hundred-fold.

Our one lesson from past experience is never to underestimate the future of engineering progress. Each new discovery opens tremendous vistas of further invention and application. The quickening tempo is logarithmic. Each new generation, building on the past, sees more progress in science and engineering than was recorded in all the preceding centuries.

Before the dawn of history, the greatest engineering achievement was the invention and application of the wheel. This was man's first great improvement upon nature The prehistoric genius who hit upon this apparently simple invention could not have visualized the vast future significance, the amazing vistas of mechanical progress thereby made possible. Hardly any subsequent engineering advance would have been possible without the wheel in its manifold developments, symbolized by all the indispensable wheels of industry, transportation, and power. One invention led to millions of others. If all the wheels used, consciously or unconsciously, in our daily lives were suddenly annihilated, our civilization would collapse.

Despite occasional myopic prophets who discounted

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Mackinac Bridge Stamp Is Dedicated On Island Today

Postmaster General Arthur E. Summerfield was the principal speaker today in exercises held at noon in Marquette Park, Mackinac Island, dedicating the new Mackinac Bridge commemorative postage stamp.

The Mackinac Bridge stamp was to be available only in St. Ignace and Mackinaw City today, and Thursday it is to be sold at all of the nation's 36,605 post offices.

Provisions were made for the visitors to the Mackinac Straits area on June 25 to obtain the new stamp at the high schools in St. Ignace and Mackinaw City, and at a postal station in the Grand Hotel on Mackinac Island.

This special First-day cancellation is unique, in that the postmark from both St. Ignace and Mackinaw City Post Offices reads "Mackinac Bridge, Michigan," and it is the first time the Post Office Department has authorized an identical first-day of issue postmark for use in two cities.

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At a luncheon held after the noon ceremonies, the Postmaster General presented autographed albums of the new stamp to designer, David B. Steinman, and to Arnold J. Copeland, the artist who designed the stamp.

Summerfield told his audience:

"From that day in 1634, when Jean Nicolet paddled his canoe to Mackinac Island Harbor, in his search for the coast of China, till today, when we honor Mackinac Island with this commemorative stamp ceremony, this beautiful island has always symbolized Michigan history to all Americans.

★ ★ ★

"The prediction of William Cullen Bryant, who visited Mackinac Island in 1846, as the Island's fur industry ceased. "Your manifest fate will now be the tourist business" is doubly assured by this bridge which will bring added millions of tourists to the now united State of Michigan.

"The postage stamps of our nation are a living record of the history of our people.

"It will very well be that future historians will include this newest marvel of engineering, the Mackinac Bridge, in this proud category of mankind's outstanding accomplishments when the story of our Twentieth Century is finally written, in terms of our great public works.

★ ★ ★

"How will the historian of the future interpret this Mackinac Bridge? What will it mean to him? What will it tell him about the United States and the people of Michigan and their life and works during this dynamic period of our history?

"I believe, it would tell him here is further proof that we were a peaceful people, intelligent and progressive; that we were a travelling people—nearly all of us automobile owners—anxious to visit our neighbors in Canada and throughout Michigan and the United States; that we disliked having any of our own people in Michigan isolated by water or any other natural barriers.

★ ★ ★

"In the very best sense this bridge truly is an architectural triumph of the greatest magnitude, worthy to take its place beside the Panama Canal, the Hoover Dam, and the Golden Gate Bridge, which already have become landmarks in the history of our times.

"For 75 years and perhaps even longer farsighted and determined Americans dreamed about a Mackinac Straits Bridge that would be a powerful stimulus to commerce and agriculture and provide an open door for all Americans to visit Michigan's magnificent Water Wonderland.

"As far back as 1884 William Saulson and others were dreaming of bridging this famed and historic Mackinac Straits to provide an all-season safe and dependable passage and open up a new era for Michigan and its people.

"Studies were made in 1920, in 1935, and again in 1940.

"Then World War II intervened and the planning was temporarily halted.

"In 1950 the Legislature led by Speaker of the House Victor A. Knox, now a Congressman, created a new Bridge Authority and appropriated $100,000 to cover its expenses of studying the feasibility

"In 1953 the 8-member Administrative Board of Michigan unanimously approved the bond issue to build the bridge which had been authorized by a more than two-thirds majority of both Houses of the Michigan Legislature.

"Great tribute is due David B. Steinman who designed this longest, most costly suspension bridge ever known to mankind, which we proudly call the "World's Greatest Bridge." He has served as designing or consulting engineer in the construction of more than 400 bridges on five continents, with eight of them winning awards as the most beautiful in America.

"Tomorrow's historian will undoubtedly note the precise and expertly planned time-table for this $100,000,000 structure. Ground was broken May 7 and 8 in 1954, and the bridge was opened to traffic Nov. 1, 1957—on exactly the day scheduled four years earlier. This is certainly a great tribute to the Mackinac Bridge Authority and the engineering and construction firms which completed this magnificent bridge exactly on time.

"The bridge is related to another development having tremendous significance, the St. Lawrence Seaway, which is scheduled for completion next year. Ships from all parts of the world then will become visitors to the Great Lakes and to lake ports of this country and those of Canada. The importance of this project on the economy of the United States and of Canada will be of great assistance to both nations as well as to the world.

"Directly related to the benefits of the St. Lawrence Seaway will be those of the Mackinac Bridge in its role as an important artery between the lands bordering the Great Lakes and the rest of the world.

"The Mackinac Bridge commemorative U. S. stamp which we now dedicate will carry the same message to all the peoples of today's world."

MICHIGAN'S MIRACLE BRIDGE

X-TG.140
58

In humility and reverence we dedicate this work of faith.

And with pride we behold what vision, courage and determination have wrought.

A poem in steel.

A dream-span on bed-rock.

A symphony in metal and stone.

The mystical union of beauty and strength.

A lyric pattern etched against the blue.

God working through man to confute the powers of evil and to add another stanza to the hymn of creation.

This Is the Song of the Bridge:

With hammer-clang on steel and rock.
I sing the song of men who build.
With strength defying storm and shock,
I sing a hymn of dreams fulfilled.
I lift my span, I fling it wide,
And stand where wind and wave contend.
I bear the load so men may ride
Whither they will, and to what end.
The light gleams on my strands and bars
In glory when the sun goes down.
I spread a net to hold the stars
And wear the sunset as my crown.

With humble pride and wonder, we look up to gaze upon the Bridge.

Outsoaring gravity and space, it rises from the waves on shining strands to arch across the sky in lofty grace.

Seen from above, a battleship appears dwarfed like a toy beneath the vaulting span.

This is our triumph over ancient fears.

A Bridge of Peace, wrought of the dreams of man!

Before it was built, we envisioned the Bridge.

We saw it clearly and clairvoyant bright:

Twin sky-piercing towers of majestic rise.

The power-packed cables in symmetry of parabolic arcs.

The titan uplift of the singing strands.

The lofty roadway bearing multitudes high above the waves.

And deep beneath the waves and tides, the massive caissons founded upon bed-rock, enduring as the pyramids.

by D. B. STEINMAN,
Consulting Engineer

There is timeless strength in those towers and poetry in the cable-borne span. The two are harmoniously joined.

Between the two pierced steel towers, framing the azure of the sky, the arching roadway slowly sweeps upward to meet the swift downward sweep of the cables.

These curves and proportions were not accidents.

It is no accident that the Mackinac Bridge is a thrill to the beholder, to lift the heart with pride and the soul with thankful prayer.

It was planned that way.

A lifetime of dedicated purpose, long years of consecrated effort, the highest yearnings of the human soul, went into the planning and building of this masterwork.

85,000 Blueprints.

A million tons of concrete and steel.

Twenty-million man-hours of sweat and toil and courage and sacrifice.

But, above all these, the priceless ingredient— ***the Spirit of Consecration.***

And that includes the qualities of vision, devotion, inspiration and integrity.

That is why the Mackinac Bridge will endure.

That is why the Mackinac Bridge is majestic.

And that is why the Mackinac Bridge is beautiful.

In the planning and building of Michigan's Miracle Bridge, no effort was spared, nothing was stinted.

The highest attainments of the science and art of bridgebuilding went into the design.

The best qualities of materials and workmanship went into the construction.

The finest qualities of honor and loyalty and teamwork went into the consummation of this great project.

These are eternal verities:

There is no excellence without effort.
There is no achievement without vision.
There is no consummation without faith.

The Mackinac Bridge is a triumph of science and art.

But, more than that, the Mackinac Bridge is a monument —an enduring monument to vision, faith, and courage.

Without the vision, faith, and courage of the people of Michigan— their leaders, their statesmen, their workers—this great Bridge could never have been built.

This is the heroic saga of the Mackinac Bridge:

Generations dreamed the crossing; Daubters shook their heads in scarn.

Brave men vowed that they would build it— From their faith the Bridge was barn.

There it spans the miles of water, Speeding millions on their way— Bridge of vision, hope, and courage, Portal to a brighter day.

—D. B. Steinman

OFFICIAL
MACKINAC BRIDGE SOUVENIR BOOK
Dedication Festival June 26th, 27th, 28th, 1958

X-TG 140
.S8

Newsweek

MAY 12, 1958

ART

Magic in Stone and Steel

"We live with the structures we build. Our works become a part of the landscape, to mar or to grace. If we are to be true to our trust, each structure we raise and each span we build must be a thing of inspiration. No one, unless he is completely without feeling, can remain unmoved at the sight of a beautiful bridge. A bridge is more than a thing of steel and stone; it is the fulfillment of human dreams to link together distant places."

For Dr. David B. Steinman, the great bridge builder of our time who wrote these lines, the most beautiful structure in the world is the Brooklyn Bridge, which was opened just 75 years ago last week and which he modernized (1950-52). From the moment that it first soared through space, the bridge has not only stirred the citizens of New York with its magical lines, but has inspired a host of artists to capture the essence of its beauty. How they succeeded can be seen in the Brooklyn Museum's current show of paintings and drawings, augmented by photographs and by blueprints drawn by the bridge's engineer, John A. Roebling.

As Dr. Steinman, who also wrote the foreword to the show's catalogue, makes clear, the visual fascination of the Brooklyn Bridge lies in the contrast between "time-defying" massiveness of the Gothic towers, "the vast sweep of the mighty cables," and the incredibly delicate web of stays which radiate from them. "The Brooklyn Bridge still remains the most esthetically satisfying of all great bridges because its builders were artists at heart. Of granite and steel and dreams, the bridge was built."

Steinman: 'Brooklyn Bridge builders were artists at heart'

Inspiration: Steinman should know. Now 71, he has designed some 400 spans throughout the world, including the 5-mile-long Mackinac Bridge in Michigan which became the world's longest (from anchorage to anchorage) when it opened last November. Six of his airy bridges have won awards as being among the nation's most beautiful. Technically, he has been a pioneer in the application of aerodynamics to the design of bridges (he was the first to explain the enigmatic collapse of the Tacoma Narrows Bridge in 1940 as due to the wind).

But however far Steinman's engineering and esthetic vision seems to have moved, his inspiration, he has always maintained, is still the Brooklyn Bridge under whose Gothic shadow he was raised on New York City's Lower East Side. His love of this bridge is overwhelming. Paintings and etchings of the span crowd the walls of his office and his Miami Beach and New York homes; a picture of the bridge appears on his Christmas cards.

Speaking of his first love, Steinman said: "It is the first suspension bridge built with steel cables and steel trusses. Its story is one of the great dramas of our age. When I came to modernize it I avoided anything that would change its appearance. I wanted to preserve the things that had nostalgic value. For instance, I retained the wooden promenade, even though some officials wanted to take it down. I also kept the old gooseneck lights—we don't use arc lights any more but we have the fixtures."

No Change: This passion to retain an aura of the past is unusual for Steinman since he has been so daring in building new bridges and in pioneering in the use of paint and light to emphasize the beauty of a bridge's lines.

"I got tired of seeing bridges painted black or battleship gray," he explained. "I thought bridges should have a little warmth, something to tie them in with their setting. First I used slight tints of green, but then I grew bolder." With the Mackinac, Steinman became audacious enough to paint the towers ivory and the span a "foliage" green.

As for putting a vivid coat of paint on the Brookly Bridge, however, David Steinman admits frankly: "I never considered it."

AISC
AMERICAN INSTITUTE OF STEEL CONSTRUCTION
FOUNDED 1921

X-TG 140
.S8

'BOOK CORNER'

In 1938, David B. Steinman, the world's foremost bridge designer and engineer was pronounced mad by some members of his profession when he argued that bridges should by rigid, not flexible. "Build a bridge too flexible," he stated, "and it will oscillate itself right out of the picture."

Bridges have a critical wind velocity, which means a bridge with a low critical wind velocity, like the Bronx-Whitestone will start swaying in a thirty-mile-an-hour wind. Dr. Steinman insisted that bridges built on a rigid principle could and would have a critical wind velocity up to infinity.

WHEN THE first Tacoma Narrows Bridge, the third longest in the world gained the name "Galloping Gertie" from the citizens of Tacoma and then collapsed in a mild gale in 1940, some engineers stopped questioning Dr. Steinman's sanity. Working out his revolutionary principles, Dr. Steinman completed the 5-mile long Mackinac Straits Bridge, longest in the world, at a cost of $100,000,000 ($35,000,000 less than estimated). As Dr. Steinman explained it, the rigid design used in this bridge not only raised its critical wind velocity to infinity, but, "utilized the wind to make it stable. The stronger the wind the more stable the bridge." "It's been checked by engineers who opposed me, who said I was crazy."

The story of the Mackinac Straits Bridge and Tacoma's "Galloping Gertie" Bridge, as well as a history of bridge building is contained in "Bridges and their Builders" by Dr. Steinman and Sara Ruth Watson, just republished by Dover (Jan. 23, $1.95). It is a part of Dover's science series which hopes to stimulate the interest of the general public and of students in science and engineering.

New York Construction News

Monday, February 3, 1958

X-TC 146
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STUDIO NEWS

M A Y

J U N E

1 9 5 8

FOR A FRIEND

As we miss the warmth and sunshine
When the veils of night descend,
So we miss your cheery greeting,
Your cordial handclasp at each meeting,
Your cherished nearness as a friend.

Through the years of golden friendship
Our affection for you grew:
Wise without a tinge of vanity,
Moved with love for all humanity,
Guide and comrade, staunch and true.

Who can fathom time or reason
When a loved one must depart?
We who knew you, loyal, kind,
Will keep you evermore enshrined
In the sanctum of our heart.

By D. B. Steinman

X-TG14C
S8

THE AUSTRALASIAN ENGINEER

MICHIGAN'S DREAM BRIDGE COMES TRUE

This is proudly acclaimed as the world's longest suspension bridge—8614 ft., including anchorages. With the approach spans it totals 17,913 ft. The 3800 ft. suspension span is second only to the Golden Gate Bridge (4200 ft.), San Francisco, but the use of five cable spans with remote anchorages makes it actually the longest bridge. Outstanding in their magnitude are the tower foundations, which are founded on rock 210 ft. below water, and involved the placing of 500,000 cubic yards of concrete. A total of 55,000 tons of structural steel, 11,100 tons of wire (41,000 miles of 3/16 inch diameter) were used. RIGHT: Designer, David B. Steinman, stands against the back-drop of his bridge, viewing his handiwork—and another job well done.

BOOK REVIEW

"MIRACLE BRIDGE AT MACKINAC"

By DAVID B. STEINMAN

[In collaboration with John T. Nevill. Produced by Wm. B. Eerdmans Publishing Co., Grand Rapids, Michigan. Price, 4.50 dollars (U.S.A.)]

An epoch-making event took place on 1st November, 1957, with the opening of the spectacular engineering feat—the £A 45,000,000 bridge across the Straits of Mackinac. The town of St. Ignace, on the north, and Mackinaw City, on the south, were linked by a permanent roadway.

The State of Michigan, U.S.A., is divided in its 59,000 square miles of territory by the waters of the Great Lake, Michigan, and the turbulent Straits of Mackinac. The only access across this four-mile passage has been by ferry.

The 17,000 square miles to the north was alien land as far as the people in Southern Michigan were economically or commercially concerned.

For over seventy years a bridge was talked of and dreamed about. The oldest territory, the birthplace of American history, as far west as the Mississippi, with its ancient town of St. Ignace, has been socially and geographically isolated since its establishment.

When possible, a small steamboat chugged across the swift-flowing waters. In winter, a treacherous ice bridge, quite unreliable, filled the gap, and while providing a hazardous passage, it proved too often to be responsible for great loss of life.

While men talked and wondered whether a bridge would ever be built, stalwart enthusiasts pegged away; and while projects were put up and as often rejected, pigeon-holed by red-tape or held over by lack of funds, the die-hards were thrown a sop in 1952 by a resplendent £A 2,000,000, 10,000-h.p. vehicular ferry, "Vacationland."

To the bridge advocates, however, this was just another hurdle in their course.

Meanwhile, the Mackinac Bridge Authority, which was first established in 1934, kept up the assault on the Legislature and finally had success in permission to issue bonds. This was done with the proviso that if the bonds were not taken up by December, 1953, the appropriation would be cancelled—and with the unexpressed wish that this would not be done.

So enters a new era. The bonds were sold and engineers and constructors moved in on the building of the bridge, and completed their work on 1st November, 1957.

It is not our work in this review to retell the whole story of this magnificent project. This is given by the authors of this book, with all the hopes and fears, all the trials and emergencies that faced the intrepid men who, under the guidance of David B. Steinman, built this miracle bridge at Mackinac.

Many progress accounts of this work, with illustrations of it in many stages, have been given in newspapers and technical journals, but the history, as written by the designer—the man who was responsible for the performance of the work—must be read by those who appreciate the merits of achievement.

Such a work could only be done by teamwork. It involves many individuals whose skills and edurance brought this dream bridge to reality. They and the engineering organisations concerned must receive due credit. This is given in the book by the author.

"To-day," as Governor G. Mennen Williams (Michigan State) writes in his foreword to the book, "Mackinac Bridge stands as a symbol of the spirit of Michigan—a spirit which has never found any job too big, if the job needed to be done."

The author, David B. Steinman, is this century's most renowned bridge designer. He needs no introduction to readers. In his spectacular career, involving the building of nearly 400 bridges in five continents, he has built structures which have received wide publicity. He has received sixty-seven recognitions, honours and awards for his work by governments concerned and his fellow-engineers.

Co-author, John T. Nevill, a veteran newsman who resided in the territory of Michigan, was so taken with its inspiration that he contributed many articles to American publications. He in collaboration with Steinman, used his skill in telling this story in his most graphic manner. Regrettably, just before it was completed, he met a tragic death when his house was burned down.

This book is recommended for quiet reading and enjoyment as a story of outstanding achievement.

X-TG140
S8

Sunday Standard-Times

NEW BEDFORD, MASS., MARCH 9, 1958

Glory of Bridges, Builders Sings Through New Book

BRIDGES AND THEIR BUILDERS
David B. Steinman and Sarah Ruth Watson
Dover

If to know a man's work is to know him, many Greater New Bedford residents know Mr. David B. Steinman: He is the designer of Rhode Island's Mt. Hope Bridge. He is also an unusual blend of designer, engineer and artist, a man who is fully, sensitively and richly aware of the symbolism of a bridge. In this book, he and Miss Watson write of bridges as art-lovers and authorities write of great paintings. The result is a strikingly vital and entertaining book that will infect the least - technical - minded general reader with Dr. Steinman's own enthusiasm.

Many illustrations of famed bridges around the world, old and new, are included in this book including one of Dr. Steinman's newest designs, the great Mackinac suspension bridge joining Upper and Lower Michigan and just recently opened. Book is a history of bridge-building from prehistoric days and a useful reference in addition to its many other merits.

X-TG140
Se

Wisconsin Poetry Magazine

Founded 1954

Vol. III March - April, 1958 No. IV

FOR A COLLEGE PRESIDENT

By tens of thousands, eager, hungry youth
They throng to slake their burning thirst for truth;
And here you greet them as a guide and friend
To spark the things of spirit that transcend
The shibboleths of ancestry and creed.
The noble word made nobler by the deed,
You move young hearts to join with one another
In warmth for you as for an older brother.
Free from pretense or tinge of vanity,
Your lamp is love for all humanity.

—*David B. Steinman*

"In all creative work whenever we are helping to make life more beautiful and uplifting, there is a feeling that we are working in partnership with the divine." —*David B. Steinman*

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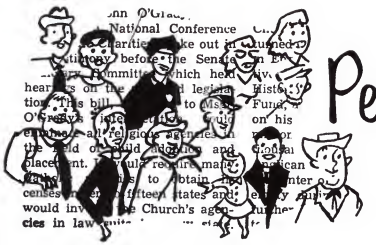

Personalities—U. S. A.

IF A BOY LIKES adventure, he should consider the life of a bridge builder. Every bridge gives engineers some new problems to work out. In N. E. we still have the covered wooden bridges which were built a century ago. There are movable bridges, bascule bridges which are divided in the middle and tilt like the blades of a jack-knife; in others a central span turns on a pivot, or is lifted up on the sides of towers. The "pontoon" bridge, floating on boats built for temporary use, particularly by armies, are also permanent structures. There are arches, trusses and girder bridges, but for spanning the greatest distances, the *suspension* bridge is champion. John A. Roebling spent a lifetime convincing people of this. When New York City and Brooklyn decided to have a bridge over the East River uniting them, Roebling persuaded them to try his suspension idea. He died before it was finished and for over half a century the mighty bridge carried an endless stream of heavy traffic. In 1950 reconstruction was begun to modernize it.

Our personality for this month is David S. Steinman, an internationally distinguished bridge engineer whose office is in the Roebling Building in N.Y.C., who received a civic medal for his work on the reconstruction of the Brooklyn Bridge. Since 1920 Dr. Steinman, who received his Ph.D. at Columbia University, has served as designing or consulting engineer in the construction of nearly 400 bridges on five continents. He is presently engaged on the world's largest bridge project: the $100,000,000 Straits of Mackinac Bridge between the peninsulas of Michigan which will have the world's second longest main span. (The San Francisco-Oakland bridge is the world's longest bridge.)

When people told the engineer that his bridges were poetry, he wrote:

THE BRIDGE AT MACKINAC

In the land of Hiawatha
  Where the white man gazed with awe
At a paradise divided
  By the Straits of Mackinaw

X-TG 140
S8

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

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OTTO V. ST. WHITELOCK

Managing Editor
FRANKLIN N. FURNESS

Associate Editor
PHILIP RESSNER

MODES AND NATURAL FREQUENCIES OF SUSPENSION-BRIDGE OSCILLATIONS

By

D. B. STEINMAN

Consulting Engineer
New York, N. Y.

NEW YORK
PUBLISHED BY THE ACADEMY

X-TG140
S8

THE LUDINGTON DAILY NEWS

An Independent Newspaper Serving Mason County and Surrounding Area

LUDINGTON, MICHIGAN, MONDAY, AUGUST 31, 1959

A MATHEMATICIAN'S ADVICE TO A YOUNG LADY

I

Take a number, just for fun.
Draw a line and marry one.
Now your adding has begun.
Multiply and carry one.

II

Avoid long division, repair it:
Just make up the difference and square it.

III

Extract the root of every trouble;
Divide your joys and they will double.

IV

A pair is greater than its parts;
One love is better than seven.
A line that joins two loving hearts
Is the shortest distance to heaven.

DR. DAVID B. STEINMAN

ENGINEERING
NEWS-RECORD

X-TG140
.S8

Mackinac Bridge, Mackinac Straits, Mich., (Class I) was designed by D. B. Steinman, of New York City, chosen for its "strength and noble proportions."

Most Beautiful Steel Bridges of 1958

X-TG
.38

Three Rivers Commercial

THREE RIVERS, MICHIGAN MONDAY, JUNE 29, 1959.

Steinman to Prepare Plans For Soo Bridge

ST. IGNACE (UPI) — The International Bridge authority today announced that Dr. David B. Steinman, designer of the Mackinac Straits Bridge has been hired to prepare specifications for a 20 million dollar bridge to link Michigan and Ontario at Sault Ste Marie.

The announcement was made by the authority along with the Michigan Highway Department and the Department of Highways in Ontario.

The $200,000 contract with Steinman calls for preliminary engineering reports, bid plans and specifications for a bridge which can be completed by the end of this year. The authority wants to begin actual construction in the spring of 1960.

Two rivers spans and the 3,000 foot Canadian approach are to be built by the International Bridge Authority while the Michigan Highway Department will construct some 4,000 feet of approach on the American side. The St. Marys Bridge Co., an Ontario public body, has assigned all its rights and interests to the International Bridge Authority and has expressed complete agreement with the plans.

A spokesmen said construction contracts will be let as soon as Steinman's work is completed and successful revenue bond financing can be arranged.

X-TG 140
SE

Philadelphia
Gazette-Democrat

Samstag, den 22. August 1959

Natur und Technik

"Brücken für die Ewigkeit"

Das Leben Johann Roeblings und seines Sohnes

Als ein "Gedicht aus Granit und Stahl" spannt sich die Brooklyner Brücke, das Meisterstück des deutschblütigen Architekten Johann Roebling und seines Sohnes Washington, zwischen Manhattan und Brooklyn über den East River. D. B. Steinmann setzt in seinem nunmehr deutsch erschienenen, überaus lebendig geschriebenen Roman "Brücken für die Ewigkeit"*) (Originaltitel "The Builders of the Bridge", von Walther Schwerdtfeger vorzüglich übersetzt) zwei genialen deutschstämmigen Ingenieuren, dem aus Thüringen gebürtigen Johann Roebling und seinem Sohn Washington, ein würdiges Denkmal. Aus dem "schläfrigen Nest" Mühlhausen, wo er am 12. Juni 1806 geboren wurde, erwarb Johann, der sich früh, als Gymnasiast, in der Mathematik auszeichnete, mit vierzehn Jahren ein Zeugnis als "Baumeister". Er tat sich auch im klassischen Zeichnen und Architekturzeichnen hervor. Mit Staunen erfährt man aus der fesselnden Biographie Johann Roeblings, daß der später weltberühmte Architekt niemals die Reifeprüfung abgelegt hat, weil es ihm an Begabung für die klassischen Bildungsfächer mangelte. Er wechselte nach Erfurt über und studierte dort bei dem gefeierten Mathematiker Unger.

Am 11. Mai 1831 reiste Roebling mit einer kleinen Gruppe von Pionieren nach Bremen ab, um als freiheitlich Denkender vorwiegend aus politischen Gründen der Heimat den Rücken zu kehren und nach Amerika auszuwandern. In Deutschland herrschten politische Wirren.

Der Autor schildert, wie unendlich viele Schwierigkeiten Roebling aus dem Wege räumen mußte, bis er nach dem Bau einer Hängebrücke über den Niagarafall und über den Ohio bei Cincinnati darangehen konnte, sein Lebenswerk zu entwerfen: die Hängebrücke zwischen Brooklyn und Manhattan. Noch ehe das große Ziel erreicht war, kam Roebling bei einem Arbeitsunfall ums Leben. Sein Sohn vollendete unter den denkbar schwierigsten Umständen das Werk des Vaters; 1883, bei der Eröffnung der Brooklyner Brücke huldigte eine staunende Welt dem Genie von Vater und Sohn: deutsche Einwanderer hatten die Elemente bezwungen, einen friedlichen Sieg der Technik errungen.

Nachstehend veröffentlichen wir Kapitelauszüge aus D. B. Steinmans reich illustriertem Buch, das sich so abenteuerlich und kurzweilig liest wie die besten biographischen Romane. Roeblings Schicksal, seine Leistungen, die wir im Zusammenhang mit dem Jubiläum der "Brooklyn Bridge" vor kurzem würdigten, wurden in dem vorliegenden Band zu einem Werk verarbeitet, das in jede deutsch-amerikanische Bibliothek und zum Wissenschatz eines jeden Deutschamerikaners gehört, denn es handelt von einem beispiellosen Triumph des menschlichen Geistes.

*

"Beim Absenken der Caissons auf der Brooklyner Seite hatte man mancherlei mißliche Erfahrungen gemacht; die Gründung für den New Yorker Turm bot noch größere Probleme, Schwierigkeiten und Gefahren. Fließsandschichten waren zu überwinden, eine fast zweimal so große Tiefe mußte überwunden werden, und man sah sich neuen und unbekannten Schrecken der Caisson - Krankheit gegenüber.

Die Entscheidung über die Brücke — so weit sie die technische Möglichkeit des Unternehmens betraf — lag im Boden und unter dem Flußbett des East River. Alles hing von dem Erfolg dieser Unterwasserarbeit ab, und die Ingenieure der ganzen Welt waren auf das Ergebnis gespannt.

Die ersten Bohrungen, die John Roebling für die Turmgründung auf der New Yorker Seite gemacht hatte, ergaben die erschreckende Tiefe von 32.30 m unter der Wasserlinie — eine Tiefe, in der man noch nie zu arbeiten versucht hatte. Duren eine kleine Lageänderung konnte diese Tiefe schließlich um rund 9 m verringert werden.

*) D. B. Steinman: Brücken für die Ewigkeit. Das Leben von Johann Roebling und seinem Sohn. Im Werner-Verlag GmbH, Düsseldorf.

K-TG 14C
.S8

Mackinac Bridge Wins Prize

The American Institute of Steel Construction has announced that the Mackinac Bridge, spanning Mackinac Straits in Michigan, has received the top award in the annual competition to choose the most beautiful bridges in America. The Board of Judges included four eminent architects and one engineer (William H. Wisely, executive secretary of the American Society of Civil Engineers).

In a speech at the time of the ground-breaking ceremonies in 1954, Dr. D. B. Steinman, designer of the bridge said: "No effort will be spared to make the Mackinac Bridge the finest, safest and most beautiful bridge in the world."

Dr. Steinman has been called "a one-man campaign for beauty in bridges." The Mackinac Bridge is the ninth Steinman bridge honored in the annual artistic bridge awards.

New York Construction News

Monday, September 28, 1959

X-T 40
S 8

THE LUDINGTON DAILY NEWS

An Independent Newspaper Serving Mason County and Surrounding Area

LUDINGTON, MICHIGAN, MONDAY, AUGUST 31, 1959

A MATHEMATICIAN'S ADVICE TO A YOUNG LADY

I

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II

Avoid long division, repair it:
Just make up the difference and
square it.

III

Extract the root of every trouble;
Divide your joys and they will
double.

IV

A pair is greater than its parts;
One love is better than seven.
A line that joins two loving hearts
Is the shortest distance to heaven.

DR. DAVID B. STEINMAN

Y-TG 140
S8

THE LUDINGTON DAILY NEWS

An Independent Newspaper Serving Mason County and Surrounding Area

LUDINGTON, MICHIGAN, FRIDAY, SEPTEMBER 11, 1959

Dr. Steinman Receives Award

Dr. David B. Steinman, a frequent contributor to Driftwood, has received an award from Wisconsin Poetry Magazine for his poem, "Michigan the Beautiful," published in the July-August issue.

Dr. Steinman's poem, written at the request of the Michigan Week committee, expresses his sincere tribute to the State of Michigan.

Y-TG140
S8

What Is Civil Engineering's Place?

- **An ENR editorial asked educators to promote civil engineering as a valuable and respected profession.**
- **Then Prof. S. B. Irish asked, in effect, "What is there to promote?"**
- **Here are some answers from our readers . . .**

Sir—With further regard to your editorial "Civil Engineering's Place" (ENR May 7, p. 116) and Prof. S. B. Irish's letter on this subject (June 25, p. 7), I would like to commend his plea for the development of a philosophy to embrace the scattered special fields that now make up the civil engineering profession.

Historically, the present fields of structures, soil mechanics, sanitary engineering, hydraulics, transportation and construction are but the remnants of the original all-embracing civil-engineering profession. Civil engineering is without clear-cut objectives or responsibilities, and, as a result, we now have the most heterogeneous group of special fields of any of the engineering divisions. This makes it difficult to develop a rational common approach to research and education.

Northwestern University held a workshop last year in Evanston to which we invited twelve participants, including civil and industrial engineers, planners and operations research specialists. After three days of intensive review and discussion, the committee concluded that the civil engineering profession was not recognizing the challenge facing it today; that in concentrating on the "trees" of specialization we were missing the "forest" of broad objectives.

Five major problems were outlined as especially significant: 1. Construction 2. Transportation 3. Urban Development 4. Overseas Development (Technical Assistance) 5. Water Resource Planning.

It was further concluded that an acceptable philosophy to cover the broad field could be described as "environmental-control planning." This infers that the primary objective of civil engineering is the control, modification and adaptation of the physical environment in the interests of man's health, comfort, convenience and efficiency; further, that a study of planning provides the broad socio-economic review needed to relate the various specialized areas and to establish the criteria necessary for good design.

As a result of these recommendations, we are now introducing a core of environmental control-planning courses in the undergraduate program and are working toward the use of these courses to integrate the special areas into a more unified curriculum.

The results of this workshop lead me to believe that a more comprehensive study of the type envisioned by Professor Irish could have far-reaching significance. I thoroughly endorse both his suggestion and your approval of it.

JOHN A. LOGAN
Professor and Chairman
Civil Engineering Department
Northwestern University
Evanston, Ill.

► Professor Irish is a very capable protagonist for the engineering profession in general and civil engineering in particular. I have no wish to dispute the points he makes, or those in your editorial either. But a point you both failed to make is considerably more important than any of them.

The "attractiveness" of any profession must basically depend upon the people in it. For civil engineering, these people naturally include Steinman, Terzaghi, the late Hardy Cross, and many other brilliant contributors. But, unfortunately, Professor Irish's doleful reference to "the more routine and mundane problems in which the civil engineer is ordinarily engaged" can only be an admission that engineering "hacks" are also freely accepted into this branch of the profession. There is no intrinsic reason, however, why civil engineering should be more firmly bound in such a yoke than any other kind of engineering.

Engineering schools all too often confer engineering degrees upon men who can never be a real asset within the profession and who would themselves be probably better off had they taken only sub-professional training in the first place. Naturally this comment applies more forcefully to some institutions than it does to others, but none can wholly escape it. Within any such institutions, it applies more to some departments than to others. It has been my observation that civil engineering departments are the most frequent and serious offenders in this regard.

Engineering schools and colleges, and the individual departments within these institutions, can do the engineering profession in particular, as well as our society in general, a real service by making more effective efforts to prevent non-professional "hacks" from getting engineering degrees.

They should increase the quality of their graduates by being more rigorously selective in their graduation requirements, thus permitting a higher level of instruction to be used in educating a more able student body. This may well reduce the total number of engineering graduates but it will certainly increase the profession's attractiveness to qualified persons. It will force a sounder recognition of what is implied by the term "professional engineering," and it will promote appropriate adjustment in financial compensation rates for the consequently up-gradcd professional work. Collaterally, employers will be forced toward the use of sub-professional staffs on sub-professional work. The certain supplemental result of such changes will be to increase the quality of both professional and sub-professional work and, at the same time, to reduce the unit cost (to the extent that the term is meaningful) of each.

Press agentry or other effort to attract more and more guests to the party is exactly what is not needed. The real need is for some means to exclude the freeloaders and the gate-crashers. The best place for a "bouncer" obviously is at the front door, and engineering educational institutions for years have constituted the front door to the engineering profession. Perhaps Professor Irish and his colleagues should act more like "bouncers" and less like a welcoming committee.

F. A. UPSON
Hammond, Ind.

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

90 TH YEAR

Midwest Engineer

SEPTEMBER, 1959

X-7 G 14
S8

—American Bridge Div., U. S. Steel

Paper by Mackinac Bridge Consultant

Mr. D. B. Steinman, consulting engineer for the Mackinac bridge, has prepared a paper entitled "Modes and Natural Frequencies of Suspension Bridge Oscillations." Because of its length and subject matter, we regret being unable to publish it. However, we understand that copies may be obtained by writing to Mr. D. B. Steinman, Consulting Engineer, 117 Liberty Street, New York 6.

The Detroit Free Press

SATURDAY, MAY 23, 1959

X-TG 140
S&

BRIDGE-BUILDER David B. Steinman gets a gift from Miss Michigan, Patience Pierce, of Detroit. She gave the Mackinac Bridge builder a State flag and made him an honorary citizen of Michigan at his offices in New York.

New Haven Journal-Courier

NEW HAVEN, CONN., TUESDAY MORNING, JULY 28, 1959

Record Span Completed Here

The longest box-girder bridge in the United States was completed here yesterday as a crowd of several hundred people watched a 98-ton steel girder link the final sections of the Oak Street Connector bridge spanning the New Haven Railroad tracks.

City, state and railroad officials looked on from a stand on Water Street as the 59-foot long girder was guided carefully into place. The eight lane bridge, designed by Dr. D. B. Steinman and constructed by the Mariani Construction Co., of New Haven, measures 878.75 feet. It is the largest bridge of its type in the nation.

'A New Story'

Mayor Richard C. Lee said the structure marked "the beginning of a wonderful new story for our city.

"By 1965," he said, "I predict we will have one of the most modern downtown shopping centers in America. This bridge is one of the great links which makes the great work of developing our downtown shopping section possible."

The portion of the connector which includes the new bridge is scheduled for completion next January.

Former State Highway Commissioner Newman Argraves was master of ceremonies. He introduced his successor Howard S. Ives who described the bridge and the connector as "just the beginning of large scale projects which will link our state."

2-Way Connection

Relocated Route 34 will flow over the new bridge to join the Connecticut Turnpike in a major interchange at Waterside Park. The interchange will furnish a two-way connection with the turnpike and the proposed Interstate Route 91.

The bridge is part of a $3.8 million State Highway Department project to complete the easterly end of the Oak Street Connector.

Work on the Connector has been completed westerly to the Park Street vicinity. Eventually the road will extend west to provide a link with Route 34 in the Maltby Lakes area.

SPAN COMPLETED—One of two final giant beams is swung into place on Oak Street Connector bridge across the New Haven Railroad's main line yesterday. The bridge, part of New Haven's vast redevelopment project, will provide access between the Connecticut Turnpike and city business district. The structure is the largest box-girder (instead of the usual I shape) bridge in the United States.

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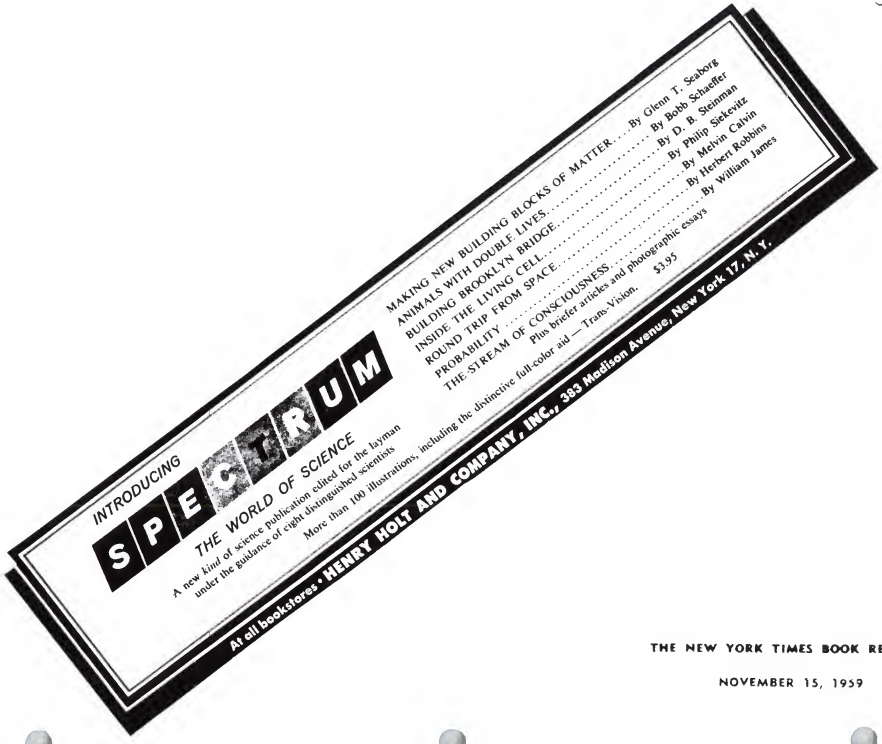
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The New York Times.

NEW YORK, SUNDAY, OCTOBER 25, 1959.

MANHATTAN SPAN TO BE REVAMPED

Two Upper Roadways to Be Rebuilt to Carry Trucks —Cost Is $7,005,980

By CHARLES G. BENNETT

The city made known plans yesterday for a major reconstruction of the Manhattan Bridge to cost $7,005,980.

The plans have been put before the Board of Estimate by Public Works Commissioner Frederick H. Zurmuhlen. The board has referred them to Budget Director Abraham D. Beame, who is expected to submit his report at the board's Nov. 12 meeting.

Under the project, the two upper deck roadways, which now accommodate only pleasure vehicles, will be rebuilt and strengthened to carry trucks weighing up to twenty tons. Lesser repairs will be made to the main roadway below.

Later there will be reconstruction of both the Manhattan and Brooklyn plazas. On the Manhattan side the bridge approach will dovetail with a redesigned street system that will include a connection with the new Lower Manhattan Expressway. In Brooklyn there will be a connection with the Brooklyn-Queens Expressway.

The bridge improvement will include replacement of existing incandescent lighting with mercury vapor lamps.

Torque Is Corrected

As a preliminary, the city completed in 1956 a $2,600,000 contract for replacing 584 cable bands and 854 suspenders. Cable bands are circular steel loops that attach the suspenderr, or wire ropes, to the cables.

The $2,600,000 job was done to correct a torque, or twisting action, of the bridge's structure resulting from stresses and strains caused by the B. M. T. subway trains on the span.

BMT tracks run on both sides of the bridge. But during the years a preponderance of train traffic has been routed onto the tracks on the south side of the bridge. The unequal loading produced the unbalanced stresses and strains.

The reconstruction timetable calls for advertising and letting of the contract before the end of this year and the beginning of necessary demolition work early next year. It is expected that at least three years will be needed for the job.

As in the case of the recent three-year reconstruction of the Brooklyn Bridge, the Manhattan Bridge will remain open to traffic during the work.

BMT trains will continue to use the span tracks. The Public Works Department and the police will devise traffic patterns to be in force during reconstruction.

The Manhattan Bridge will be the third of the large East River crossings to undergo major reconstruction in the last few years. In addition to the $7,000,000 Brooklyn Bridge rebuilding job, the Public Works Department recently finished an $8,000,000 project on the Queensboro Bridge that included a new upper deck roadway.

The Manhattan Bridge was opened to traffic on New Year's Eve, 1909. It extends 6,855 feet across the East River from Canal Street and the Bowery in Manhattan to Nassau Street and Flatbush Avenue Extension in Brooklyn.

The main span, 1,470 feet long, is suspended from four cables, each 21.25 inches in diameter.

The plans for the reconstruction were drafted for the Public Works Department by Dr. David B. Steinman consulting engineer.

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TUFTS UNIVERSITY

PRESENTS

STEINMAN POETRY LECTURES 1959-60

The second year of the Steinman Poetry Lectures opened on October 7, with a reading by John Holmes, author of "The Double Root," "Map of My Country," "Writing Poetry," and other books. Robert Lowell, Pulitzer Prize winner, author of "Lord Weary's Castle," and "Life Studies," read on Oct. 21. The third poet was George Starbuck, 1959 winner of the Yale Younger Poets' Award. These readings were given in the Coolidge Memorial Room, Ballou Hall, with an informal question period following refreshments at the end of the reading. David McCord, author of "Star By Day," "The Old Bateau," and editor of "The Pocket Book of Light Verse," read in the Arena Theater on Sunday evening, Nov. 23. John Ciardi, Tufts '38, poetry editor of the Saturday Review, Director of the Bread Loaf Writers' Conference, and author of "As If," "39 Poems," "I Marry You," and "Homeward to America," read on Dec. 14, return engagement by popular request. Laura Benet read her poems and those of her brothers in English 75, 20th Century Poetry, on Nov. 16. Two San Francisco poets, Michael McClure and Philip Whalen, read at 4:30 p.m. in Packard Hall on Nov. 17.

MAXINE KUMIN — Jan. 13

Mrs. Kumin's first book, "Halfway," will be published this year, as well as a book for children, "Sebastian and the Dragon." Her poems appear in *Harper's, The New Yorker, Saturday Review, Hudson Review,* etc. She won the Poetry Society of America prize for 1959, and is an instructor in English at Tufts University.

COOLIDGE MEMORIAL ROOM, BALLOU HALL — **8 P.M.**

RICHARD EBERHART — Feb. 19

At present Consultant in Poetry at the Library of Congress, Mr. Eberhart is on leave of absence from Dartmouth College. He is the author of "Reading the Spirit," "Undercliff," "Great Praises," and other books; his "Collected Poems, 1930-1960," will appear this year. Educated at Dartmouth College and Cambridge University, he publishes his poems and books in England and America. He has won the Harriet Monroe Prize and the Shelley Memorial Prize, and was a

X-TG 146
.58

"He that overcometh shall inherit all things; and I will be his God, and he shall be my son."

Alfred P. Haake, Ph. D.
ECONOMIST, CONSULTANT AND LECTURER
HI-OAKS -- 11496 OAKHURST ROAD
LARGO, FLORIDA

HELEN R. HAAKE, SECRETARY
PHONE: JUNIPER 4-4559

December 27, 1959

D. B. Steinman, Consulting Engineer
117 Liberty Street
New York 6, N.Y.

Dear Dr. Steinman,

Thank you for the copy of the latest book on yourself. I enjoyed the Long Crossing very much and anticipate no less the pleasure of reading the longer story of your life.

I am grateful that you have and keep me on your mailing list. I think your poetry, and I mean poetry, is among the most beautiful penetrating of modern verse. It is a great gift and you use it well.

May you enjoy a thoroughly satisfactory New Year with still growing influence on your fellow man. For your bridges of iron and stone are at best the symbols of other spaces which you help men to bridge in their thinking and living, helping men to find their way to God, the greatest bridge of all.

Sincerely yours,

Alfred P. Haake

Alfred P. Haake
11496 Oakhurst Road
Largo, Florida

RECEIVED
DEC 30 1959
D. B. STEINMAN

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LOYOLA UNIVERSITY

COLLEGE OF ARTS AND SCIENCES

*6525 North Sheridan Road, Chicago 26, Illinois * BRiargate 4-3000*

December 4, 1959

Dr. David B. Steinman
17 Liberty Street
New York 6, New York

Dear Dr. Steinman:

The David B. Steinman Lectures for 1959-60 got off to a wonderful start last night. All of the tickets for the lecture were exhausted about three days before. The auditorium was full--about 750 people.

Mr. Van Doren arrived at Loyola about 4 o'clock and met informally with faculty and students at a tea that lasted until about 5 o'clock.

In the evening I myself made introductory remarks acknowledging especially our debt to you. I made reference to your poem "As a Starless Sky." No doubt I was taking some liberties with the meanings you intended. But I likened the "dream" of the first stanza to your bridgebuilding and the vision involved in it. I associated the "song" of the second stanza with your work as a poet and your generous patronage of poetry. And the "prayer" of the third stanza I suggested as symbolic of your deep sense of spiritual values.

Since this was the first lecture in the series, Fr. Mulligan, the Vice-President and Dean of Faculties, also spoke on behalf of the University's administration of our gratitude to you.

Then Mr. Van Doren was formally introduced by Dr. Earl John Clark of our department. In place of reading many short selections, Mr. Van Doren read two long ones with generous commentary on them. It was a highly successful performance, with the speaker and the audience showing their mutual admiration at the conclusion of it. Afterwards there was a reception for about fifty people, at which the same tone prevailed.

We ourselves are very much pleased thus far, and I hope that when you read this you will be too.

We have been intending from the outset to ask if you would like to come to Chicago to introduce one of the speakers. I assumed that since you had just gone south you would probably not want to come up here at this time. Perhaps you would like to introduce Robert Penn Warren, on April 6. This would be fitting in that it would provide a good culmination of the series and in that the weather may be good here at that time. Please let me know when you can, if you would like to do this.

I hope that you and Mrs. Steinman are enjoying good weather in Florida and that your stay there will be a most pleasant one.

RECEIVED

DEC 7 1959

D. B. STEINMAN

Very sincerely yours,

John S. Gerrietts

John S. Gerrietts
Chairman, Department of English

JSG:rpm

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PRISM

THE OFFICIAL ORGAN

OF THE

POETRY SOCIETY OF AUSTRALIA

As Through a Misted Glass

by
D.B. Steinman

As through a misted glass we faintly glimpse
A shimmering vision of the spirit realm —
The veil that mortal eye may never rend.
We gaze with yearning toward that fair mirage,
Striving to hold it as it fades from view.
Then we awake, but never can we know
Which state is dream, and which reality.

April, 1959

X-TG140
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THIS SINGING EARTH

D. B. Steinman

NOT LIKE LUCIFER

O men of science who, with single aim,
Explore the elemental mysteries —
The pulse of light, the atom's secret core,
The swing and orbit of the cycling stars:
What of the things beyond your utmost lore,
That neither graph nor scale nor rod can gauge,
Nor lens of telescope detect or span?

Whence burns your flame of selfless enterprise,
Your ceaseless quest to fathom the unknown?
What inner spark illuminates your mind
And spurs your search for truth exalting man?

High priests and acolytes of nature's laws:
Be not like Lucifer in pride of power,
Rather more humble grow, more reverent.
Your miracles but glorify the Source,
The Logos, perfect Word, that preconceived
The vast sublimities you now unveil.
With aeons visioned in the primal plan,
The laws of nature are the thoughts of God.

AVALON ANTHOLOGY

1959

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LIBRARY JOURNAL

DECEMBER 1, 1959

LJ / New Books APPRAISED

STEINMAN, David B. Songs of a Bridge Builder. ill. by Reynold H. Weidenaar. 64pp. 59-12934. Eerdmans. Sept. $2. POET

This slight volume has been attractively printed on a waffle-finish paper with black-and-white illustrations by Reynold H. Weidenaar. The poems, many of them, have appeared before in the better popular journals and magazines. They represent the "recent avocation" of David B. Steinman, the world-renowned bridge engineer, creator of the Mackinac Bridge, and of "over 440 bridges on five continents." As such we applaud them, for we agree with I. A. Richards that every man should seek himself in poetry. Almost every one of the poems here expresses the sincerity and humanity of their writer. The minor elegy, "Hart Crane and the Bridge," alone makes the volume. There are others too, "Angel, Siren, Woman" and "Korean Scheherazade," which touch the deeps of human experience. Most of the poems, however, touch only surface sentiments and often in language of locution or image which has done service too long. Alone, any one of the poems has its competence and poignancy; as a collection, however, they tend to offset one another. Is it a too easy acceptance of things as they are and of things as we dream their reality? We miss both the hard-won equilibrium of the classic poem and the hard-held tension of the romantic. Yet poems these are and poems should be read today of all days. Recommended for libraries having special poetry collections. —Herbert Burke, Asst. Prof. of English, St. John's Univ., Collegeville, Minn.

DECEMBER 1959
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THE BENT of Tau Beta Pi

WHO'S WHO IN TAU BETA PI

Dr. David B. Steinman, *New York Alpha '06,* received the top award in the annual competition of the American Institute of Steel Construction for his Mackinac Bridge, spanning the Mackinac Straits in Michigan. This is the ninth Steinman bridge honored in the annual artistic bridge awards. In October he received the Ernest E. Howard award by the American Society of Civil Engineers. A book about the Mackinac Bridge has been written by William Ratigan, called, "The Long Crossing." The book is published by W. B. Eerdmans, Grand Rapids, Michigan, and is written chiefly for young people.

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Final Curtain

by
D.B. Steinman

And now the play is drawing to an end.
It thrilled me while it lasted, though I knew
In time the final curtain must descend.

The veil between the unreal and the true
Almost forgotten, in the drama's sway.
In bright illusion's spell, how moments flew!

I want to thank the Author for the play,
Its laughter and its tears - I did not weep
Though stage lights dimmed. Content, I go my way

Drawn by the tender call of home and sleep.
I have a rendezvous with love to keep.

PRISM

December 1959

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AMERICAN SOCIETY OF CIVIL ENGINEERS

1959

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Manhattan College
New York 71

President's Office

November 5, 1959

Dr. David B. Steinman
117 Liberty Street
New York 7, New York

Dear Dr. Steinman:

Thank you for the autographed copy of your book, Songs of a Bridge-builder, certainly a modest poet-engineer's title.

I enjoyed the total collection of poems. They convey the power of your faith in man and God, and in man's ability through use of creation and through contemplation of the realities -- if only his eyes of sight and mind would see the realities -- to contribute to joy and goodness and beauty.

Men should ever hold you in grateful reverence for your distinguished bridges and poems. They will read both literally and find in them the artistic use of words, materials, and rhythms. Moreover, the human spirit will also respond to the artistry of their design and music. Beyond and most of all, your poems and bridges will live in men's hearts for the visions of exalting truth they inspire: courage and faith, hope and love, and sudden flashes or illuminations about the Divine order working in and through man.

May you have deep and lasting joys of accomplishment in Songs of a Bridge-builder.

Cordially,

Brother Augustine Philip

Brother Augustine Philip, F.S.C.
PRESIDENT

BAP:mkd

RECEIVED
NOV 6 1959
D. B. STEINMAN

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CANDOR

MOMENT OF SPLENDOR

By D. B. Steinman

Evanescent
as a crescent
of the moon,
As fireflies hover
glimmering over
a blue lagoon,
Love is a tender
moment of splendor,
dying too soon.

JULY 1959

Wisconsin Poetry Magazine

November December, 1959

RAINBOW IN ALOHA

When last I saw that island paradise
(What pang of parting as we sailed away!)
A farewell rainbow flowered in the skies
And spectra sparkled in the surf-tossed spray.

The air, the scene, the moment cast a spell
As memory-binding as a fond refrain.
The sunlit waves; soft voices, like a bell
Tolling us back: "Until we meet again."

There East meets West. Upon those shores of light,
That isle of smiles, that port of friendly faces,
All colors blend — yellow and brown and white —
And make the land of *Aloha* a haven of **races.**

— *D. B. Steinman*

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Hammerhead piers carry turnpike bridge

D. B. STEINMAN, F. ASCE, Consulting Engineer, New York, N. Y.

C. H. GRONQUIST, F. ASCE, Associate Engineer with D. B. Steinman, Consulting Engineer, New York, N. Y.

Each roadway of the James River Bridge on the Richmond-Petersburg Turnpike is supported separately by hammerhead piers. A total of 100 of these piers carries the 4,182-ft-long bridge over the historic James River at Richmond. Single-column piers, set to the angle of the stream, allowed square rather than skew span construction. This method of construction was also advantageous in pier location for the northern half of the bridge. Situated in downtown Richmond, this part of the bridge passes over viaducts that carry the Southern Railroad, the Chesapeake and Ohio Railroad, and the Seaboard Airline Railroad.

The 90-ft-wide James River Bridge is the largest structure on the recently completed Richmond-Petersburg Turnpike in Virginia. Since the river is shallow and navigable only by small boats, 88-ft steel, simple-beam, composite spans proved economical for the river portion of the project. Simple-beam spans up to 96 ft in length, and girder spans up to 115 ft in length, were employed over land in Richmond, although a 260-ft skew truss spans the railroad parking lot at the Main Street Railroad Station to meet requirements of the Seaboard Airline Railroad Company. The south half of the bridge is on tangent; a 1-deg curve begins near the north bank of the river, and a 4-deg curve occurs beyond Main Street at the skew truss span.

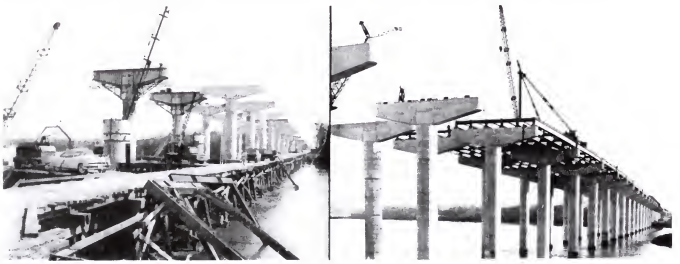
The reinforced concrete deck consists of two 40-ft roadways separated by a 4-ft mall, with a 2-ft walkway on each side. Concrete parapets are surmounted by aluminum railings 18 in. high, in which the electrical cables for the roadway lighting system run.

The two-year construction period required fast scheduling and careful coordination of the operations of all contractors. In order to open the bridge and turnpike to traffic by June 30, 1958, it was necessary to start placing the 7-in. concrete deck slab in the previous December and to continue throughout the winter months. This was done with the use of heated aggregates, but no special protection was given to the deck concrete after placing, other than to cover it with plastic blankets and tarpaulins.

Pier design

The columns for all the hammerhead piers were made 7 ft 9 in. in diameter, and the 44-ft top struts or hammerheads for all the piers, except for those in a few longer girder spans, have the same dimensions, to minimize vari-

Working from a timber trestle, Bowers Construction Co. built the river piers, pouring the columns in maximum lifts of 16 ft. Hammerhead forms were made self-supporting by use of truss-ing bearing against the column concrete. At right, a traveling derrick on the roadway deck sets steel brought out on a car operating on two of the adjacent roadway beams.



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AMERICAN

ROAD BUILDER

NOVEMBER 1959

This month's cover—The vital artery across Mackinac Straits between Michigan's Upper and Lower Peninsulas, Mackinac Bridge, won the Class I Award in the American Institute of Steel Construction's Annual Bridge Competition (see other winners on page 26). The Class I Award is for the most beautiful steel bridge, with a span of 400 feet or more, opened for traffic during the preceding year. The jury, in picking the Bridge for the Award, praised this "manumental structure" for its "strength, handsome silhouette and beauty it gains from its noble proportians and mass." The Bridge is owned by the Mackinac Bridge Authority; designed by D. B. Steinman, a member of ARBA's Engineering Division; and fabricated by the American Bridge Division, U. S. Steel Corporation, a member of ARBA's Materials and Services Division.

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JETS-O-GRAM ACADEMIC UNIT
on

STATICS

RIGID STRUCTURES

MEASUREMENT AND EVALUATION OF STATIC STRUCTURES

TESTING THE MACKINAC BRIDGE FOR AERODYNAMIC STABILITY

Static structures are designed and built according to definite mathematical formulae. Engineers know they will do the job for which they are intended, but every new design however, is an adventure because man is always being confronted with new problems and elements as he pushes his structures further in the sky, deeper into the earth, or like a bridge, across greater spans of space.

When confronted with an unknown element, he must have some means of measuring and evaluating the structure he has designed before it is built. For this purpose, he has devised testing techniques and tools which enable him to determine the effectiveness of the proposed structure. When engineers design something, they know it will be stable, then they get even greater professional satisfaction out of testing it or its component parts and seeing them meet the requirements of design.

Pressure is one thing to be figured, but in bridges, another factor - oscillation - or sway, caused by winds must be considered in design. In a structure reaching high above land and water, wind velocities put great force on the members and the entire structure must be tested from an aerodynamic standpoint. Lift and drag of air must be studied just as it must be studied on the wings or other flight surfaces of an aircraft.

There is perhaps no more static structure yet one subjected to greater winds than the Straits Bridge which joins the Upper and Lower Peninsulas of Michigan. On this, oscillation has to be investigated to its fullest extent to test the design.

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"Roebling's Dream." When John A. Roebling completed his design of Brooklyn Bridge, a member of his staff made this drawing. All the weight of the bridge is in the two towers, their foundations, and the anchorages for the cables. The rest is wire, slender by contrast, spidery against the sky, but endowed through the magical art of John Roebling with strength that matches the time-defying massiveness of the masonry.

Building Brooklyn Bridge

The greatest drama in the history of bridge building

BY D. B. STEINMAN

D. B. Steinman studied engineering at Columbia, where his dissertation was a design for the proposed Henry Hudson Bridge. Twenty-five years later he was chosen to carry out the plan. Hundreds of other bridges, all over the world, are also his work. His achievements have brought him 24 honorary degrees from universities in several countries. Dr. Steinman's books include THE BUILDERS OF THE BRIDGE *(Revised: Harcourt, Brace and Company, 1950), about the father and son who designed and built Brooklyn Bridge.*

OCCASIONALLY something gets done that is so unprecedented, so grand, that it sets new standards for human aspiration. The erection of Brooklyn Bridge was such an achievement. And because certain intangibles of the human spirit went into it, it has kept its urgent appeal to our imaginations. To me—remembering the days when I was a poor boy living in the shadow of the Bridge and being moved by its mysteries to become a designer of bridges myself—Brooklyn Bridge is sacred.

In 1867 there was no doubt of the need for a bridge to link Brooklyn and the rest of Long Island to Manhattan Island, across East River. The population of Brooklyn was growing explosively; 266,000 in 1860, it reached 396,000 in 1870, an increase of 50 percent in a single decade. A vast number of Brooklynites

XETG140
S8

MIDWEST CHAPARRAL

FALL - WINTER, 1958-1959

My Creed

To follow my star and breast the wave,
Nor once to furl my sail;
Whatever waits beyond the grave,
Never to quit or quail.

But here and now to heed my heart
And help my fellow man,
For each of us is but a part
Of an eternal plan.

To thank the Giver for His trust
In lending life to me,
Whether this spark returns to dust
Or immortality.

—**D. B. Steinman**
New York

The Magazine of the Registered Professional Engineer

American Engineer

OCTOBER 1959

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Steinman to Head MDAA Division

Dr. David B. Steinman, New York City, has been named chairman for the third consecutive year of the Engineers and Scientists Division of Muscular Dystrophy Associations of America, Inc., it has been announced by William Mazer, MDAA president.

Dr. Steinman will organize support for MDAA's 1959 Campaign for funds to increase medical research into the crippling, muscle wasting disease, muscular dystrophy.

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Hill News

St. Lawrence University, Canton, N. Y., Wednesday, March 18, 1959

DAVID B. STEINMAN

Steinman Famous As Engineer, Poet

Why the Spring Festival of Arts is prefaced with the name David B. Steinman has been a point of curiosity to many students. To enlighten them, his name has been affixed to this event because he gave the University $1,500 last year to make the first Festival possible.

Dr. Steinman is the dean of modern bridge builders. But this man is not, as often happens, "one-track minded" about engineering and his bridges. He is also a poet. A combination to be admired, he is a living example of what a liberal arts college stands for—education of the whole man. This is the reason for his interest in art and thus our Festival.

On the bridge-building side, Steinman is known for his principle of aerodynamic oscillation, which in plain English, is the construction of suspension bridges to withstand winds. This principle made possible his Mackinaw Bridge in Michigan which is five miles long and cost $100 million. It is the biggest and costliest suspension bridge in the world. But in time it may be surpassed by another Steinman colossus, a five-mile long bridge across the Strait of Messina between Italy and Sicily.

Called the "poet in steel", he has also had 200 poems published, most of them about bridges and their builders. The patron of our Spring Festival of the Arts, Dr. David B. Steinman, is an example of a well-rounded professional man.

XTG140
S8

The American Bard

41 Years of Continual Publication

October, November, December, 1959

Poems Of Early America

Ojibwa Legend

By the falls of Tahkamennon,
Frostbound in the silent moonlight,
Sat an old chief in his wigwam,
White-haired warrior, battle-weary,
Huddled in a snowy blanket.
With his strength now swiftly fading,
He recalled his feats of prowess,
Boasted of his former magic.

"When I blew my breath upon them,
Streams and waterfalls stopped flowing,
Turned to ice of stony hardness.
When I shook my locks, the snow fell,
Covered forest land and prairie;
Birds flew south and beasts found burrows.
None so mighty as Pebowan,
Wielder of the blasts of winter."

Came a young brave to the wigwam,
Fair of face and manner godlike.
Thus he spoke with voice like music:
"When I come the earth awakens:
Flowers spring up at my whisper;
My soft breath unlocks the waters,
Spreads blue skies and April glory,
Calls the birds back from the southland.

"At my nod fall gentle showers,
Bathing vale and hill with freshness,
Giving life to leaf and blossom;
With my song the land rejoices.
Let me dwell here; I am Seegwun,
Spirit of rebirth and gladness."
Dawnlight found the frost-king vanished,
By the spell of springtime banished.

New York *David B. Steinman*

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Artículo publicado en el n.º 110 de la Revista Informes de la Construcción

Abril 1959

proyecto

puente sobre el río QUINNIPIAC

Información amablemente facilitada por el autor del proyecto Dr. Steinman

562 . 45

El puente sobre el río Quinnipiac, en New Haven (EE. UU.), es, de las obras de fábrica de la autopista de Connecticut, la de mayor longitud, y presenta la particularidad de salvar su tramo central, de 118 m de luz, con cuatro vigas gemelas de alma llena, tipo cantiléver, y parte rectilínea de cierre de unos 33 m de longitud.

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S8

names

Dr. David Barnard Steinman, PE

A lifetime of distinguished service to his profession has propelled Dr. David Barnard Steinman, PE, to international prominence as a master designer of bridges. Over 400 bridges, on five continents of this earth, bear testimony to Dr. Steinman's genius and widely acclaimed accomplishments. He has received awards for a brilliant record in research of the aerodynamics of bridge structures and the application of metallurgical developments to bridge construction.

Now 73 years old, the master bridge-builder modestly acknowledges the many honors his works have earned him as he still continues planning his next project, which he believes to be the most inspiring of his career—a new span across the Messina Straits, linking the mainland of Italy and Sicily, the cost of which is estimated at $150 million.

Born on New York's lower east side, virtually within the shadow of the Brooklyn Bridge, Dr. Steinman was fascinated as a boy with the structural play of this famed bridge. Through his early formative years, this bridge served as a personal symbol of his own aspiration to become a designer of bridges. As an undergraduate, he attended The College of the City of New York where he proved a brilliant student, graduating *summa cum laude*. He received his graduate degrees in engineering from Columbia University. In addition he has received over 20 honorary degrees in science, engineering, philosophy, literature, humanities and law bestowed upon him by such universities as Bologna, Ghent, Columbia, Michigan, RPI, Loyola and others.

Early in his career, he designed in association with Holton D. Robinson, the winning entry for the Florianapolis Bridge competition, now the largest bridge in South America. Since then, his works have been legion, including the Hell Gate Arch Bridge, the Carquinez Strait Bridge in California, the longest cantilever bridge in the U. S.—the Mount Hope Bridge in Providence, R. I., the Tri-Borough Bridge in New York City, the Thousand Islands International Bridge, and the recently completed Mackinac Bridge in Michigan, which is five miles long

He played a significant role in the organization of the *National Society of Professional Engineers*, and he served as first president of that society, as well as president of its New York Chapter. Dr. Steinman's illustrious career includes several years spent as Professor of Civil and Mechanical Engineering, and lecturer at leading universities and colleges. He is the author of over 750 publications, including 20 books and 600 technical papers and professional articles. His undaunted spirit and belief in the engineer's invaluable service to humanity are reflected in his 150 poems, published in four anthologies and numerous literary journals. His honors and medals, virtually innumerable, include the *French Legion of Honor*, eight *Artistic Bridge Awards*, the *William Proctor Award* for scientific achievement, the *Townsend Harris Medal* and the *Kimbrough Gold Medal* of the *American Institute of Steel Construction*.

An opponent of specialization in engineering curricula, Dr. Steinman abhors the prevailing shortage of engineers and the lack of a broad liberal foundation upon which a student in engineering may build his courses. He believes, "the engineer should take the position of a cultured professional—a leader of men." The *David B. Steinman Foundation* was established to further these beliefs through grants to education for research and student aid. A respected authority and a benevolent humanitarian, Dr. Steinman summarizes his feelings toward his profession: "To me engineering has been a succession of inspiring influences, of compelling ambitions, of obstacles overcome and dreams come true. The realization—one after another—of dreams that seemed hopeless leaves me reverent and humble." Indeed, scholar, educator, poet, author, engineer Steinman is a great and gifted man.

CIVIL ENGINEERING

Ernest E. Howard Award

D. B. STEINMAN

D. B. Steinman, New York City consulting engineer, receives the Ernest E. Howard Award. Known and honored the world over as designer and builder of beautiful bridges, Dr. Steinman is currently cited "for his signal contribution towards the advancement of bridge analysis and design, to the theory of the suspension bridge and its aerodynamic stability, and especially for his outstanding work in the design of the Mackinac Bridge." Among the notable bridges, in addition to the Mackinac Straits Bridge, for which Dr. Steinman was designer or consultant are the Florianapolis Bridge in Brazil; the Mount Hope Bridge in Rhode Island; the Carquinez Straits Bridge in California; the Henry Hudson Bridge in New York; the St. Johns Bridge in Oregon; the Thousand Islands International Bridge; the Baghdad Bridge over the Tigris River in Iraq; the Kingston Bridge across the Hudson; and the Raritan River Bridge in New Jersey. Author of over 750 publications, Dr. Steinman has been awarded four other Society prizes for his papers in Transactions, including the Norman Medal in 1923 and 1951.

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THE AUSTRALASIAN
ENGINEER

National Society of Professional Engineers

IMPORTANT AMERICAN BODY

Dr. D. B. Steinman, leading American engineer, who has designed some of the greatest bridges of our times, some twenty-five years ag in 1934, to use his own words, "dreamed of a national organisation of, by and for, all engineers — a national organisation dedicated to a great cause, a defined, integrated and unified Engineering Profession.

Citing the American Medical Association and the American Bar Association as precedents, he envisioned a strong unifying National Society of Professional Engineers with State Societies and County chapters as integral component units.

At that time there were only two societies of professional engineers, one in New Jersey and one in New York. There were, however, over ninety older established technical societies, but they served rather to emphasise the division of the profession in so many technical branches and special ties.

With his natural enthusiasm and application, Dr. Steinman spoke extensively about organising such a body as he envisaged and on May 25th, 1934, the National Society of Professional Engineers was born. Some suggested that the National Society should be merely a federation of state societies, but he stressed individual membership and voice in the National Society.

Registration of Engineers

Dr. Steinman insisted that the most important way to advance the status of the engineer, his standing in public recognition and esteem, was to establish a clear-cut line of demarcation between engineers and non-engineers so that the public would know, and the profession would know, and the individual himself would know who is and who is not an engineer. He contended that the only effective method of establishing this line of recognition was by legal qualification and registration.

With the inspiration and impetus of the newly-formed National Society, the registration movements gained momentum and before long engineers' Registration Laws were on the statute books in all of the forty-eight States, the district of Columbia and in every territory and possession of the U.S.A. At the same time State Societies of Professional Engineers were also formed in every State and territory.

Twenty-fifth Anniversary

On July 20th, 1959, the organisation held its Twenty-fifth Anniversary and Dr. Steinman, as the founder and first President, was requested to address the gathering.

Looking back across the span of twenty-five years, we can view the results of our vision and sacrifice with a deep glow of satisfaction. The National Society, started in 1934 with four young State Societies, now numbers a total of 50,000 members, fifty member State Societies, and 400 Local Chapters, with 4,000 Committees, all working for the advancement of the engineering profession in public recognition and esteem.

Our dream has come true. We have achieved public and legislative recognition that Engineering is a Profession, that Engineering is a **learned** Profession, that Engineering is **one** Profession.

Personally, I feel that I have lived many lives in one lifetime, and that the life I gave to my profession has not been lived in vain. For those of us who have known the struggles and the hardships of engineering in the lean and difficult years, there is deep satisfaction in knowing that we have done our part in making engineering a finer, nobler, and more satisfying profession for those who come after us."

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KINGS COUNTY
PROFESSIONAL ENGINEER

OCTOBER, 1959

TOP ART AWARD FOR MACKINAC

The Mackinac Bridge, spanning Mackinac Straits in Michigan, was selected as the most beautiful bridge opened to traffic in America during 1958.

In granting the top award in the annual competition to choose the most beautiful bridges in America sponsored by the American Institute of Steel Construction, the Committee praised this "monumental structure for its strength, handsome silhouette and beauty it gains from its noble proportions and mass."

Obviously Dr. Steinman, who designed the Bridge, has fulfilled his promise made during groundbreaking ceremonies in 1954, that "no effort will be spared to make the Mackinac Bridge the finest, safest and most beautiful bridge in the world."

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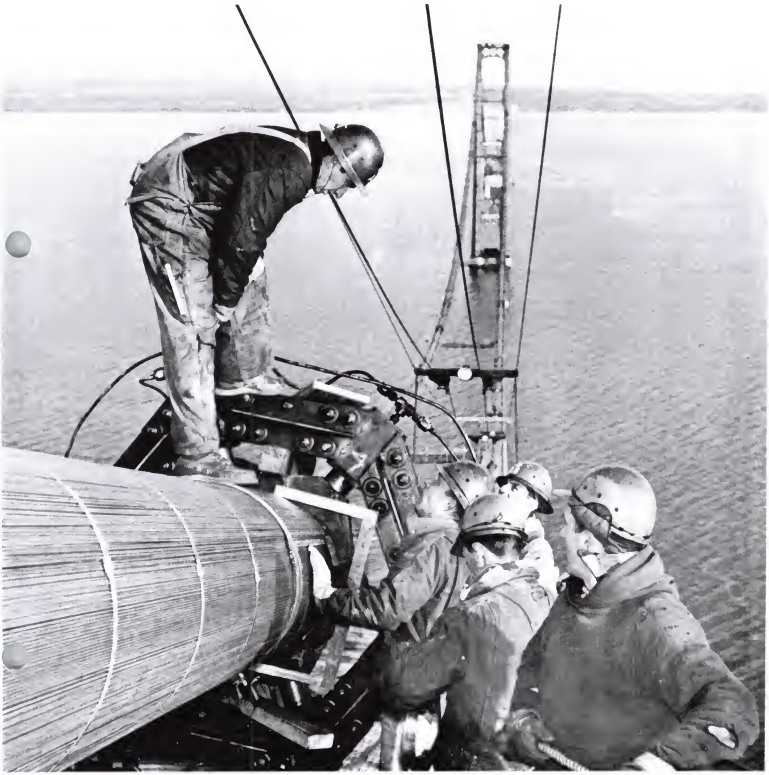
MIRACLE AT MACKINAC

BY PRENTISS M. BROWN
Chairman, Mackinac Bridge Authority

High over the Straits workmen check diameter of a giant cable during construction of "The Great Bridge."



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The Wheeling Intelligencer

Wednesday, Dec. 30, 1959 ·

Dr. DAVID STEINMAN
Gets Bethany honorary degree

Bethany Will Give Degree To Engineer

The faculty and trustees of Bethany College have voted unanimously to confer the honorary degree of Doctor of Humane Letters upon Dr. David Bernard Steinman, noted bridge builder, engineer and poet.

Dr. Perry Epler Gresham, president of Bethany College, said that the L.H.D. degree will be conferred on Dr. Steinman on May 7, 1960. Dr. Steinman will speak that day during a convocation which will be a part of the annual fine arts festival of the school.

Dr. Steinman, dean of American bridge builders, has designed and built more than 440 bridges on five continents, including Michigan's famous Mackinac Bridge. More than 150 of his poems have been published in leading poetry magazines and in five anthologies.

Dr. Steinman is the subject of a new biography, "Highways Over Broad Waters," which was written by William Ratigan and published by the William B. Eerdmans Publishing Company of Grand Rapids, Mich.

"The faculty and board of trustees of Bethany College voted the honorary degree L.H.D. to Doctor Steinman because he exemplifies the academic ideals of Bethany College," President Gresham said.

"He is one of the foremost engineers in the world who has the broad literary and cultural interests of a true product of the liberal arts and sciences. Doctor Steinman has achieved distinction as a great humanist.

"We hope this honorary degree conferred in the presence of all our students will inspire them to emulate his good example."

Dr. Steinman is now engaged on the world's first intercontinental bridge over the Bosporus and also on bridges in Baghdad and Pakistan. He also designed the planned new 12,000-foot international bridge over the St. Mary's River at Sault Ste. Marie, Mich., and its Canadian counterpart.

Dr. Steinman received the B.S. degree summa cum laude from the College of the City of New York, the M.A. and the Ph.D. degrees from Columbia University.

He holds honorary degrees from two of the oldest and most distinguished schools in the world, the University of Bologna in Italy and the University of Paris in France.

The highest international honors in science, engineering and art have been awarded Dr. Steinman. He has received more than 100 foreign decorations.

He is the author of 24 books, including "Famous Bridges of the World," "Mackinac Straits Bridge," "Suspension Bridges," and "Song of a Bridge Builder." He has written 600 professional articles and has been a contributor to Encyclopedia Britanica, Encyclopedia Americana and Colliers Encyclopedia.

Dr. Steinman has received more than 50 prizes, awards and honors for poetry. His poems have been published in the United States, Canada, England, Australia, Ireland, France and Italy. A number of the poems have been set to music and have been sung in public concerts and recitals.

He is a life member and a former trustee of the Poetry Society of Ameriea.

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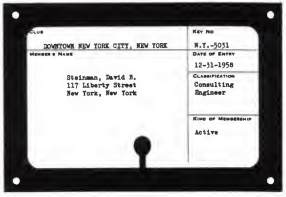
David B. Steinman has designed and built more than 400 bridges throughout the world. One of them is the five-mile-long Mackinac



DEAN OF THE BRIDGE BUILDERS

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JOURNAL
OF THE
AMERICAN
CONCRETE
INSTITUTE

Steinman receives ASCE Howard award

The ASCE Ernst E. Howard award is the latest of a long list of honors conferred on David B. Steinman, internationally famous engineer. Presentation was made at the recent annual ASCE meeting in Washington, D. C.

Known and honored the world over as the designer and builder of beautiful bridges, Dr. Steinman is currently cited "for his signal contribution towards the advancement of bridge analysis and design, to the theory of the suspension bridge and its aerodynamic stability, and specially for his outstanding work in the design of the Mackinac bridge." The Mackinac bridge is the ninth Steinman bridge honored in the annual artistic bridge awards.

Author of over 750 published works, Dr. Steinman has received four other ASCE awards for his papers, including the Norman medal in 1923 and 1951.

December 1959

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MICHIGAN S.F.W.C. NEWS LETTER

Published by the Michigan State Federation of Women's Clubs

Sebewaing - - Michigan Berdie R. Kaatz - Editor October-November 1959

Bridge Designer Honors "Big Mac" in Poem

Dr. David B. Steinman, famed designer and chief engineer of the $100 million Mackinac Bridge, writes poetry and music as a hobby.

Although not a resident of Michigan, Dr. Steinman has been a frequent visitor during the last 10 years and is generally considered the state's No. 1 Honorary Citizen.

Dr. Steinman wrote "Michigan The Beautiful" recently for 1959 Michigan Week.

Michigan the Beautiful!
Paradise the red man knew,
Where the deer still range the greenwood
And the lakes reflect the blue.

Michigan the Beautiful!
Where the smoke of campfires curled,
Now a thousand wheels are humming
Day and night to serve the world.

Michigan the Beautiful!
Haven of the heart's desire;
Smiling farms and gleaming cities
Keep alight our Freedom's fire

Michigan the Beautiful!
Land of forest, lake and stream,
Home of sturdy pioneers,
Builders of the Western Dream.

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The METHODIST MESSENGER

Volume 9—No. 2 Published by the Methodist Church, St. Ignace, Michigan December 1959

CHRISTMAS MAGIC

The star-shaped snowflakes softly fall
To deck each bough with sparkling white
With magic wand and stars are hung
Like jewels of celestial light
The treetop holds, as crowning gem
The glowing Star of Bethlehem!

Once shepherds saw the wondrous light
Beside a crib they knelt in prayer
The humblest hearth now glows with Love
Because His gift—a Child—is there!

The Angel voices sing again:
Peace on Earth, Good Will to Men!

DR. DAVID B. STEINMAN
in Songs of a Bridgebuilder

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Increasing Safety of Bridge Construction

AERODYNAMIC STABILITY SOLUTIONS BY Dr. DAVID B. STEINMAN

(From Our New York Correspondent)

Dr. David B. Steinman, the famous bridge designer, recently received a medal from the Franklin Institute in Philadelphia for his outstanding paper, "The Design of the Mackinac Bridge for Aerodynamic Stability."

Dr. Steinman was among the first to have recognised the importance of aerodynamic oscillations for bridge construction. He is not satisfied with some of the existing bridges. As he pointed out a short time ago, some twenty bridges completed since 1930 have been subjected to disturbing or dangerous oscillations. At least two of them, the Golden Gate Bridge in San Francisco, and the Bronx-Whitestone Bridge in New York, meanwhile have undergone costly stiffening reconstruction.

MACKINAC BRIDGE

Designed by Dr. Steinman, who has been responsible for the design of 400 bridges, 100 of which are major constructions.

Lesson from the Tacoma Narrows Bridge Collapse

In 1940 the narrow strait between Tacoma and the Olympic Peninsula in Washington State, was spanned by a suspension bridge which collapsed in a 42-mile-an-hour wind after four months of existence. The motions of the suspension span, even in gentle breezes, caused seasickness among the construction workers. Dr. Steinman had previously suggested that the span be stiffened.

Dr. Steinman used his principles of aerodynamic bridge construction in Michigan's Mackinac Bridge, the longest suspension bridge of the world. He described the principle by these words: "When the bridge floor is moving up, the resultant aerodynamic forces act down, and vice versa. As a result, any incipient vibration (as from traffic) is quickly brought to rest. The bridge actually utilizes the force of the wind to produce stability; the stronger the wind, the more stable the bridge."

Ralph Segman stated that though aerodynamics has been utilized by aircraft designers from the beginning of the air age, they were not applied to bridges. Wings are shaped in such a way that the airflow around them produces a greater pressure on the under surface, thus a lifting force. Similar forces act on bridge roadways. In a steady wind, the flexible span tends to oscillate up and down in harmony with the air pressure which acts rhythmically to force it up and then down. These oscillations are self-exciting and may, in a short time, become violent in non-aerodynamic bridges.

Contributing to the high degree of aerodynamic stability of the Mackinac Bridge is the provision of wide open spaces between the stiffening trusses and the outer edges of the roadway. The trusses are spaced 68 ft. apart and the roadway is only 48 feet wide, leaving open spaces 10 ft. wide on each side, for the full length of the suspension bridge. For further perfection of aerodynamic stability, the equivalent of wide longitudinal opening is provided in the middle of the roadway.

The two outer lanes, each 12 feet wide, are made solid, and the two inner lanes and the centre mall (24 ft. of width) are made of opengrid construction. Wind-tunnel tests have con-

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Steinman

At the right is a sketch of Dr. David Steinman, noted engineer and designer of the Mackinac Bridge. For a third season, Dr. Steinman has enabled the English Department at Loyola to present a series of lectures and readings by well-known poets. Through his generosity, students, teachers, and devotees of poetry throughout the Chicago area, have had an opportunity to hear readings by no less than Robert Frost, W. H. Auden, E. E. Cummings, Marianne Moore, and Allen Tate. Already, this season, Loyola has been visited by Mark Van Doren and John Crowe Ransom. Yet, like so many patrons, Dr. Steinman's interest in poetry is not limited to patronage; he has written and published a considerable amount of his own poetry. In this issue of *Cadence*, we are honored to print one of these poems.

The Harp

D. B. Steinman

Five stories high above a city street
He dwelt, a child with wonder in his eyes.
For him, through winter cold and summer heat,
The sunbeams danced and stars sang lullabies.

One day, as if on wings, a stranger came
And stood within the room, unheralded.
Gently he spoke, calling the boy by name:
"David, play on your harp!" he softly said.

How did the stranger guess the secret dream
That, day and night, within the child's heart burned?
Outside the window, in the sunset gleam,
Glittered the instrument for which he yearned:

A bridge! The cables swung across the bay,
The strands that hummed like harp-strings murmuring,
They whispered to the child, "Some day . . Some day . . "
"There is my harp, sir. I can hear it sing!"

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DIE BAUTECHNIK

MIT „KERNENERGIE UND BAUTECHNIK"
„VORFERTIGUNG IN DER BAUTECHNIK" – „BAUMASCHINEN UND BAUBETRIEB"

36. Jahrgang BERLIN, November 1959 Heft 11

VERSCHIEDENES

Einiges vom amerikanischen Großbrückenbau der Nachkriegszeit

Bild 1. Ansicht der Mackinac-Brücke

Amerika wird bald um einige aufsehenerregende große Hängebrücken reicher sein. Diese werden die Reihe fortsetzen, welche vor hundert Jahren mit dem Bau der Brooklynbrücke über den Eastriver in New York begann, als es dem Deutschamerikaner John Röbling gelang, die Hängekabel im Luftspinnverfahren am Bauwerk herzustellen. Bis zum zweiten Weltkrieg schien es, als ob die 1937 errichtete Golden-Gate-Brücke in San Franzisko mit 1280 m Spannweite der Mittelöffnung den Schlußpunkt dieser Reihe darstellen würde, denn sie übertraf bereits die 1932 erbaute George-Washington-Brücke um 213 m. Aber schon kurz nach dem Krieg schmiedeten die amerikanischen Ingenieure Pläne für noch größere Brückenbauten. Imponierend ist, daß sie sich hierbei nicht durch Rückschläge — wie den Einsturz der großen Tacomabrücke — beirren ließen. Sie suchten vielmehr mit großer Gründlichkeit, die Ursachen dieser Fehlschläge zu erforschen. Die Untersuchungen ergaben, daß die Tacomabrücke und manche andere Brücke nur ungenügende Querstabilität hatte und gegen Windkräfte nicht sicher genug war. Als erste Folgerung wurden alle Hängebrücken, die den neu gewonnenen Erkenntnissen nicht entsprachen, verstärkt. Dies geschah meist durch Einziehen von Schrägseilen oder durch den Einbau von Verbänden, um die Verdrehungssteifigkeit zu erhöhen. Bei der 1952 fertiggestellten Chesapeake-Brücke – dem ersten größeren Neubau — zeigt sich noch eine gewisse Zurückhaltung, denn die in diesem 6,9 km langen Brückenzug verwendete Hängebrücke hat „nur" eine Spannweite von 165 m; im übrigen wurden Fachwerkträger angewendet (teils als Deck- und teils als Trogbrücke). Nach Abschluß der Untersuchungen konnten die amerikanischen Ingenieure sodann im November 1957 ihre neueste und nunmehr größte Hängebrücke dem Verkehr übergeben, die Mackinac-Brücke, die über die Wasserstraße gleichen Namens im Norden der Vereinigten Staaten führt (siehe Bild 1). Bei dieser Brücke — einem Werk des Brückenbauers Dr. D. B. Steinman — wurden alle gewonnenen theoretischen und praktischen Erkenntnisse der letzten Jahre verwertet. Im folgenden sollen kurz einige wesentliche Merkmale dieses großen Bauwerkes geschildert werden.

Die 55 000 t schwere Stahlkonstruktion hat eine Gesamtlänge von 5730 m. Die 1870 bzw. 1270 m langen Rampen sind durch Fachwerk-Parallel-Träger überbrückt, die sämtlich als Deckbrücken ausgebildet sind und Spannweiten bis zu 170 m aufweisen. Das Kernstück bildet die 2257 m lange Hängebrücke, deren Kabel noch um je 185 m weiter bis zum Ankerblock geführt sind (wegen der dort geringeren Wassertiefe), so daß sich sogar eine Länge von 2627 m ergibt. Sie übertrifft die Golden-Gate-Brücke zwar an Gesamtlänge, jedoch nicht in bezug auf die Mittelspannweite. Letztere beträgt 1159 m (Golden-Gate-Brücke 1280 m). Das Bild der Mackinac-Brücke ist infolge großer Einheitlichkeit sehr ansprechend. Besondere Bauaufgaben brachte bereits die Gründung dieser Brücke, die allein 25 Millionen Dollar verschlang und den Einbau von über 300 000 m³ Beton erforderte. Die Pfeiler mußten durch eine Brekzienschicht — eine Felsmasse aus verkitteten Gesteinsbrocken — hindurch bis auf eine größte Tiefe von 62 m unter dem Wasserspiegel zu dem tragenden Baugrund hinabgeführt werden. Die größte Wassertiefe im Bereich der Hauptöffnung beträgt fast 80 m!).

Von den insgesamt 34 Pfeilern und Endwiderlagern wurden in Anbetracht der großen Wassertiefe nur 24 in umspundeter Baugrube errichtet, sieben Pfeiler stehen auf bis zu 30 m langen Stahlpfählen und bei den drei Pfeilern, die eine Gründungstiefe von 50 bis 60 m unter dem Wasserspiegel haben, wurden eingeschwommene Senkbrunnen angewendet. Es sind dies die beiden Pfeiler für die Pylonen der Hängebrücke sowie ein weiterer Pfeiler. Diese Senkbrunnen mit teils kreisförmigem (siehe Bild 2) teils

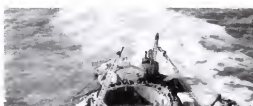

Bild 2. Ausbaggern eines Senkbrunnens

rechteckigem Grundriß haben Grundflächen von 14 · 28 m bzw. 35 m Außendurchmesser und Tiefen bis zu 62 m. Der unterste, etwa 15 m hohe Abschnitt dieser Brunnen wurde auf einer Schiffswerft

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☆☆☆

Favorite Prayer

Of Dr. D. B. Steinman, the World's Leading Bridge Builder, New York City:

All-merciful and loving Father: We thank Thee for the blessings of Life, and Light, and Love, and for Thy infinite understanding and compassion; and we pray that Thou wilt turn men's hearts to Thee—to speed the coming of Thy Kingdom of abiding Peace and Brotherly Love.

X. TG 140
.S 8

NEW MEXICO
MAGAZINE

September, 1959

Poems OF NEW MEXICO

MY SON

His cry of anguish stabbed me like a knife;
My son, my infant son, with gasping breath,
Lay clinging to the dying spark of life,
A child-heart faltering at the gate of death.

We watched the candle flicker through the night;
And when the doctor rose and shook his head,
I fought the tears of grief, with lips pressed tight;
The world turned black and all my hopes were dead.

And then I prayed—Oh, how I prayed!—to One
Who feels the sorrows of humanity;
I prayed to Him—Who also loved His Son
And knew the heart-break at Gethsemane

And as I prayed, the breath of life returned,
The son I loved came back from death's dark door;
And then I wept, with pent-up tears that burned,
And gave my heart to Him forevermore.

—D. B. Steinman

PARTNERS
September
1959

X. TG 140
. S 8

STARS ABOVE AN ANT-HILL

By D. B. STEINMAN

The stars must weep when looking down to see
This sorry ant-hill called humanity:

A world enslaved by perfidy and pride,
Where hate is crowned while love is crucified.

When, from the ant-hill, we regard the stars,
We glimpse a hope beyond our tragic wars;

New reverence is born when wondering eyes
Gaze upward to behold eternal skies.

TRANSFIGURED CITY

By D. B. STEINMAN

Leaving the Western plains, we wing our way
Above the billowed cumulus that shrouds
The checkerboard below. At dusk of day
We glimpse our goal and swoop down through the clouds.

With catch of breath, we suddenly behold
A web of roadways strung with jeweled light,
Festoons of rubies, emeralds and gold,
Like fabled Baghdad of enchanted night.

And in the glow the flashing gems impart
To domes of glass and steel, to tower and spire,
One feels the pulsing of a mighty heart:
This Queen of cities, robed in lambent fire.

X. TG 140
. S 8

Conquest

A Magazine for Christian Youth

SEPTEMBER 1959 Volume XIII No. 12

SO LITTLE DOST THOU ASK OF ME

By D. B. Steinman

How beautiful my garden grows,
  So grateful for a little care!
I thrill to see each budding rose
  With fragrance like a thankful prayer.

A little bird food I supply.
  How joyously the birds repay!
On topmost boughs against the sky,
  They sing for me all through the day.

I try to do my little part
  To spread some kindliness and cheer;
As radiant sunshine floods my heart,
  I hear a whisper, God is near!

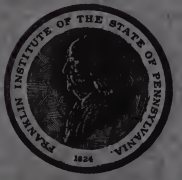
O Lord, for all Thy boundless grace,
  So little dost Thou ask of me:
To make a simple dwelling place,
  A corner in my heart for Thee!

X-TG/140
58
#150

MODES AND NATURAL FREQUENCIES OF SUSPENSION BRIDGE OSCILLATIONS

By

D. B. STEINMAN



Reprinted from Journal of the Franklin Institute
Vol. 268, No. 3, September, 1959

X. TG 140
.S8

PENINSULA POETS

ANTHOLOGY

THE SONG OF THE BRIDGE

With hammer-clang on steel and rock
I sing the song of men who build.
With strength defying storm and shock
I sing a hymn of dreams fulfilled.

I lift my span above the tide
And stand where wind and wave caress.
I bear the load so men may ride
On rainbow road to happiness.

The light gleams on my strands and bars
In glory when the sun goes down.
I lift a net to hold the stars
And wear the sunset as my crown.

D. B. Steinman

In The New York Times

Copyright 1959

By the Poetry Society of Michigan

American Engineer

SEPTEMBER 1959
Vol. 29, No. 9

T. TG 140
.S 8

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

Dr. D. B. Steinman

First President, National Society of Professional Engineers

D own through the vista of receding years
O ne sees a youth whose keen creative bent
C arried him ever on to new frontiers
T ugging unceasingly toward accomplishment.
O ften harsh trials would his path befall:
R ugged the climb, but still he persevered,

S teadfastly prompt at his profession's call
T oward final triumph; by the world revered.
E ver an artist as he built each span
I n the exalted manner of the past;
N ever found lagging: always in the van;
M aster in building bridges that shall last.
A s we salute his genius, we acclaim
N o less the artistry which has brought him fame!

—Jay F. Krakauer, P.E.

Van Wert, Ohio, Tuesday, August 18, 1959

VAN WERT TIMES-BULLETIN

X. TG 140
. S 8

Gives More For Student Loan Fund

ADA — Another $5,000 has been given to Ohio Northern University's college of engineering, it has been announced by Lawrence H. Archer, dea of engineering.

Dr. David B. Steinman , one of the world's foremost bridge designers, donated the gift to be used in the scholarship and loan fund that bears his name.

He established the fund with an initial $5,000 from which 30 loans were made to needy and deserving engineering students. The faculty and department involved screen those students petitioning for a loan.

X – TG 140
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"MIGHTY MAC"

STORY OF THE MACKINAC BRIDGE

New Book Tells Fascinating Story

Michigan's five-mile long Mackinac Bridge, affectionately known as "Mighty Mac," is the longest suspension bridge in the world. A new book entitled "Mighty Mac — The Official Picture History of the Mackinac Bridge" by Lawrence A. Rubin, has just been published by the Wayne State University Press (American price $4.95). Mr. Rubin was Executive Secretary to the Mackinac Bridge Authority.

"The finest, safest and most beautiful bridge the world has ever seen" — as the Mackinac Bridge has been described—was officially opened on June 28th, 1957.

Since the commencement of construction in 1953, the great problems associated with the construction of this bridge, that it had repeatedly been said could never be built, have fascinated engineers and people generally throughout the world.

THE MACKINAC BRIDGE — WORLD'S GREATEST SUSPENSION BRIDGE

Length from anchorage to anchorage, 8614 feet; height, 552 feet; cost 99,800,000 dollars. Designed by Dr. D. B. Steinman.

The Governor of Michigan, in his foreword, says: "This bridge across the straits of Mackinac ranks with the Pyramids, the great hydro-electric dams, the skyscrapers of Manhattan and the Panama and Suez Canals, as one of the most wondrous works of the hand and brain of man.

"For generations man dreamed of a land route across the straits of Mackinac, a route which would constitute a new north-west passage from the great cities of mid-America to the American and Canadian north-west. Today, through the faith, the will and the determination of the people of Michigan, that dream is a reality."

The Worlds' Greatest

Rising to a height of 552 feet above the straits "Mighty Mac" stretches to an overall length of 8614 feet from main anchorage to main anchorage, its nearest competitor being the Golden Gate Bridge with 6450 feet. The George Washington Bridge spans 4600 feet and the Brooklyn Bridge 3468.5 feet.

The bridge was designed by that great American bridge-builder, Dr. D. B. Steinman and a feature of the book is Dr. Steinman's special chapter on the design of the bridge, which he regards as his crown achievement. [See page 47.] We publish herewith this chapter in toto, as it graphically describes all the major problems and the features of the bridge from start to finish.

Extensively Photographed

The construction was extensively photographed under the auspices of the Mackinac Bridge Authority by Herm Ellis and his assistants and altogether some 3,000 black-and-white photographs and 1,000 clour transparencies were taken during the various construction phases. Likewise, another 1400 feet of 16mm. film was taken for motion-picture documentary purposes.

The book is consequently generously illustrated with 204 fine photographs, from the initial pin-pointing of the precise location on the water to the brilliant displays of fireworks during the four-day celebrations marking the dedication of the bridge.

While paying tribute to the engineer and builders of the bridge, great recognition must also be given to Senator Brown and his colleagues, who laboured so diligently to arrange the necessary finance which was carried out by $99,800,000 worth of Mackinac Bridge Authority Bonds.

Consulting Engineer

X. TG 140
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New Thousand Islands Bridge

A second span is being added to the International Rift Bridge, one of the five bridges of the Thousand Island International Bridge crossing the St. Lawrence

New bridge, foreground, will speed one-way traffic between the American and Canadian customs offices.

River. D. B. Steinman, New York consulting engineer, has designed the new 90-ft reinforced concrete structure and a reinforced concrete pump and transformer house on one shore between the two bridges. Completion date is scheduled for July 1959.

March 1959

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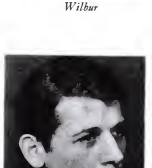
MacLeish (left) and Holmes

Ransom

Wilbur

Sandburg



Ciardi

A Distinguished Lecture Series

DURING 1958–59 Tufts University is presenting a series of public readings, known as the Steinman Poetry Lectures, by five of America's best poets. The series has been made possible through the generosity of David B. Steinman, the eminent designer and builder of bridges, and himself a writer as well as a patron of poetry. Mr. Steinman's best-known bridge is perhaps the Mackinac Bridge, connecting the Michigan peninsulas, which was depicted on a three-cent stamp last summer. It is the longest suspension bridge in the world. Mr. Steinman has built and designed more than 400 bridges on five continents, and has won countless honors, including the Scientific Research Society's highest award for his research and inventions in suspension bridge aerodynamics.

Archibald MacLeish, the first poet in the series, provided a moving and inspiring evening for a capacity crowd in Cohen Auditorium on October 20. Introduced by Tufts Professor John Holmes as "our outstanding man of letters and public life," Mr. MacLeish prefaced his readings, which covered the range of his work, with informal and piquant remarks which heightened the meaning and effect of each of his selections. Many in the audience, visibly affected by the poet's insight, personality, and masterful presentation, took advantage of the opportunity to meet Mr. MacLeish at the reception following his reading in Alumnae Hall.

On Dec. 3, John Crowe Ransom, great teacher and critic, continued the series on the same high level. Mr. Ransom has been Carnegie professor of poetry at Kenyon College in Ohio since 1937. There he founded the Kenyon School of Criticism, out of which grew the phase of modern criticism popularly known as "the new criticism," which studies poetry's logic and texture. His total output of poetry is small, but it has powerfully influenced other poets. A charming and disarming Southerner, Mr. Ransom's reading of his poems was delightful and rewarding.

Richard Wilbur will be the third of the Steinman poets, coming to Cohen Auditorium on February 16 at 8:00 P.M. The youngest poet in the series, he is looked up to by those poets younger than he, and admired by those older. His third book, "Things of This World," won the Pulitzer prize and the National Book Award in 1957. An Amherst graduate, he has taught at Harvard and Wellesley, and is now professor of English at Wesleyan University.

The fourth poet will be Carl Sandburg. The man who has given us Lincoln helped open a new era in American poetry, with his Chicago poems, in 1914, and is known and read and loved everywhere. He will read his poems, and sing a few songs, on March 18, introduced by Professor Holmes. Carl Sandburg received an honorary degree from the hands of President Wessell in June, 1955, with Arthur Anderson, President of the Board of Trustees, looking on happily. Mr. Sandburg looks forward, he says, to seeing Tufts again, and his friends, the two great Swedes. Tufts looks forward to hearing Carl Sandburg, whose unforgettable voice, reading and singing, is itself an American experience.

John Ciardi, Tufts '38, is the fifth of the Steinman poets, and will be presented by his former teacher, Pro-

X. TG 140
. S 8

The Surveyor

& MUNICIPAL & COUNTY ENGINEER

Saturday, 14 March 1959

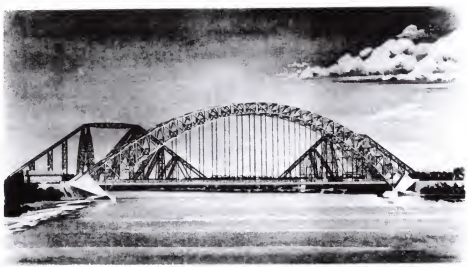
New rail bridge over the Indus river

U.S. engineer's design for 807 ft. steel arch

Plans and specifications for what is claimed to be the ninth longest steel arch in the world have just been completed by Mr. D. B. Steinman, consulting engineer of New York, who has designed a new railway bridge for the Pakistan Government over the Rohri channel of the Indus river near Sukkur in West Pakistan.

The steel-trussed arch will have an 806 ft. 9 in. span between end pins of bottom rib. The rise of the bottom rib is 180 ft. and the distance between ribs at the crown is 24 ft., making the total height of the structure 204 ft. The bridge will carry approximately E.55 loading on one broad-gauge (5 ft. 6 in.) track.

The old Lansdowne bridge, situated 100 ft. upstream from the new project, is a cantilever bridge completed in 1889 from plans by Sir A. M. Rendel, and has a span of 820 ft. It is now restricted to light rail traffic at 5 m.p.h., but will be converted to carry road vehicles after the completion of the new bridge early in 1961.



Design for the Indus River bridge at Sukkur, Pakistan (consulting engineer, D. B. Steinman of New York)

A. TG 140
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ENGINEERING NEWS-RECORD

January 22, 1959

New Bridge to Canada Coming

Engineering recommendations for a long-sought bridge to connect the U. S. and Canada at Sault Ste. Marie (Michigan and Ontario) call for 12,000 ft of bridge and approaches.

The toll crossing would carry two 14-ft traffic lanes and two 2-ft walkways. Cost is estimated at $18 million.

The U. S. section would include two main spans, each 430 ft long, with two 200-ft-long end spans. The Canadian side would have one 430-ft-long main span and two 200-ft-long end spans.

These main structures are to bridge the American and Canadian ship canals. Lessers spans will cross the U. S. power canal and the St. Mary's River rapids.

River spans would total 4,810 ft. American approaches would be 4,145 ft long; Canadian approaches, 3,045 ft.

The report was prepared by D. B. Steinman, New York City consulting engineer. It is being studied by the International Bridge Authority, a body created by the State of Michigan and subscribed to by the Ontario interests.

The authority is also investigating methods of financing the crossing, and a report is due in a month or two.

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. S 8

ESCANABA DAILY PRESS

Escanaba, Michigan, Thursday, January 8, 1959

Steinman Plan For Soo Bridge Is Recommended

DETROIT (AP) — Construction of the proposed $18,198,000 International Bridge at the Soo as a two lane, 12,000 foot long structure —counting approaches—was recommended Wednesday.

In an engineering report to the three governmental agencies concerned, David B. Steinman, New York consulting engineer and designer, proposed two 14-foot traffic lanes and 2-foot emergency walkways on both sides.

The river spans carrying the roadway over the American and Canadian ship canals, the power canal on the U.S. side and the St. Mary's river rapids would total 4,810 feet in length.

The approaches on the American side would cover 4,145 feet and on the Canadian side 3,045 feet. Toll plazas would be in addition to these dimensions.

Steinman, designer of the Mackinac and other famous bridges, proposed the crossing be located just east of the existing railroad bridge across the river.

His detailed recommendations were presented at a meeting of Michigan and Ontario highway officials with members of the International Bridge Authority.

The plans called for 67 piers. The crossing would be effected through shallow water of 20 foot maximum depth. The piers would be founded in sandstone rock.

Steinman estimated it would take 18 months for actual construction. He estimated operation and maintenance costs at $325,000 a year.

The report took note of the possible alternative of constructing a 4,805 foot tunnel in making the international traffic link.

The cost of a tunnel was estimated at $27,500,000. Construction time was estimated at 36 months and maintenance and operation costs at $475,000 a year.

Under the bridge plan, the toll plaza on the American end would be situated adjacent to Pine Street between Easterday and Ravine streets in Sault Ste. Marie. The structure would swing north in a gentle S curve to the river spans.

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THE BOSTON HERALD

SATURDAY, JANUARY 3, 1959

SO LITTLE DOST THOU ASK OF ME

By D. B. STEINMAN

How beautiful my garden grows,
So grateful for a little care;
I thrill to see each budding rose
With fragrance like a thankful prayer.

A little bird-food I supply,
How joyously the birds repay:
On topmost boughs against the sky,
They sing for me all through the day.

I try to do my little part
To spread some kindliness and cheer;
As radiant sunshine floods my heart,
I hear a whisper, God is near!

O Lord, for all Thy boundless grace,
So little dost Thou ask of me:
To make a simple dwelling place,
A corner in my heart for Thee.

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Tufts Weekly

Serving The Tufts Campus Since 1895

TUFTS UNIVERSITY, MEDFORD, MASS., WEDNESDAY, FEBRUARY 18, 1959

Richard Wilbur, Steinman Poet, Is Well Received By College Audience

By PETER LIVINGSTON

Richard Wilbur, Pulitzer Prize winning poet, read from his works as the third Steinman poet on Monday evening in Cohen Auditorium.

Earlier this year, the Tufts community was host to Archibald MacLeish and John Crowe Ransom and it was a striking contrast to these men who have shaped twentieth century poetry and criticism, to listen to Mr. Wilbur, perhaps the best of our young poets, who is just coming to the height of his powers. Ransom and MacLeish have shared in shaping our immediate poetic past, Wilbur will have a major part in our poetic future.

Precision and Polish

Mr. Wilbur is an artist in the highest sense of that term; one is immediately conscious of precision and polish in his work. Each word is exactly weighted to convey perfectly the mystic union of sound and meaning that enriches a poem. Mr. Wilbur possesses an astonishing vocabulary of poetic words that enable him fully to take advantage of the rich heritage of the English tongue.

His extensive vocabulary is also evident in his easy handling of rhyme, for first of all he is a poet of form. "To try to revive the force of rhyme and other formal devices, by reconciling them with experimental gains of the past several decades, is itself sufficiently experimental."

Thus as one of the foremost young poets in America, Wilbur seems to represent a conservative break with the radical poets of the early part of the century who were following Rimbeau in the Symbolist revolt against Romanticism and its oversubjectivity.

New Geneation

Mr. Wilbur believes that his generation is more communicative than the poets who immediately precede. Yet, the new do not reject the old but defend their experiments, perhaps even their excesses, and construct new works upon the newbroken ground.

Declining Romanticism

Usually new paths are cut by rebels who strike out in new directions in reaction to the values and goals of their predecessors. Thus, romanticism was a reaction to the growing emasculated intellectualism of the neo-classicists and symbolism reacted to the sentimental excesses of declining romanticism.

Whether Wilbur and his contemporaries represent the conservative entrenchment of our rebel-past or the groundwork of a new rebellion is difficult to determine. However, no one could not have been impressed by this tall, lanky poet who read to us his rich verse filled with laundry and turkey, fountains and snowmen and railway stations, always lyric and fully formed, ever true to the "things of this world."

X. TG 0
. S 8

THE PROPOSED LIBERTY BRIDGE OVER UPPER NEW YORK BAY

X. TG 140
. S 8

Brücken mit großen Spannweiten

Von

D. B. Steinman, Beratender Ingenieur, New York City

X. TG 140
. S 8

Introduction of Past President David B. Steinman at Past Presidents' Luncheon, Silver Anniversary Meeting, June 20, 1959, New York City.

It is fitting that we should climax this recognition of the past leaders of our Society during the last twenty-five years with recognition of the founder of NSPE. Will Dr. David B. Steinman and Mrs. Steinman please stand?

In the spring of 1934, David B. Steinman requested representatives of the New York, New Jersey, Pennsylvania and Connecticut Societies of Professional Engineers to meet with him to discuss plans for the formation of a new national engineering organization. When the engineers representing these four state societies met with Dr. Steinman at the Columbia University Club, they decided on the basic principles still governing this Society. They were: (1) Membership would be restricted to registered professional engineers; (2) Every member of the National Society would also be a member of his state society and his local chapter; (3) The National Society would be an individual-member organization, not merely a federation of state societies; (4) The Society would devote its entire energies to the non-technical phases of engineering common to all types of engineers, both by training and employment.

They met again on September 3, 1934, at which time a Constitution was adopted and a set of officers was elected. The first vice president was Major G. W. Batten of Pennsylvania, the second vice president Colonel Hugh A. Kelley of New Jersey, the treasurer was Willard S. Conlon of Connecticut, and the executive secretary appointed at that time was T. Keith Legare of South Carolina. The Society wisely chose David B. Steinman as the first president of NSPE. The first official meeting of the Society's board of directors was held in New York on March 15, 1935; and the Society has continued to flourish since that time. During Dr. Steinman's tenure as president of NSPE in 1935 and '36, he visited many of the states in the union, addressing engineering groups on the values of professionalism and the need for a three-level, individual-membership organization with high standards of membership, devoting its energies toward developing engineering as a profession. The seeds he planted immediately took root and sprouted, bearing fruit within a few months in many areas. In other states the seeds lay dormant for a number of years. Twenty-five years after these propitious beginnings the Society has matured to where it now has fifty affiliated state societies, nearly 400 local chapters in all major areas of engineering employment, and over 50,000 individual members.

MICHIGAN WEEK MAY 17-23

SUNDAY — SPIRITUAL FOUNDATIONS DAY
MONDAY — EXCHANGE OF MAYORS DAY
TUESDAY — HOSPITALITY DAY
WEDNESDAY — OUR LIVELIHOOD DAY
THURSDAY — EDUCATION DAY
FRIDAY — OUR HERITAGE DAY
SATURDAY — NEW FRONTIERS DAY

WE'RE PROUD OF MICHIGAN

1960 THEME:
PRODUCTS OF MICHIGAN

STATE COMMITTEE OFFICE
110 STEVENS T. MASON BUILDING
LANSING, MICHIGAN

X. TG 140
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MACKINAC BRIDGE DESIGNER WRITES MICHIGAN WEEK POEM

Dr. David Steinman, the distinguished designer of the Mackinac bridge and other famous spans around the world, has shown his affection for Michigan by writing a poem, "Michigan the Beautiful" especially for Michigan Week. The poem will be presented to the public during the Week in some special manner to be determined by President Harlan Hatcher of the U. of M. as chairman of the Cultural Activities Board of Michigan Week.

Not only that, but Dr. Steinman has written us that he will fly a Michigan flag from his office window in New York throughout Michigan Week.

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Le Travailleur

(Weekly devoted exclusively to the recording and the promotion of Franco-American cultural activities)

Jeudi, le 2 juillet 1959

Spécial pour «Le Travailleur»

Poésie américaine

Petite anthologie de poètes contemporains habillés en français par

Rosaire Dion-Lévesque

* * *

A LA FRANCE

Quelle est donc ta magie, ô France
Charmant nos coeurs d'une romance?
Tu vêts d'amour et de chansons
Ce printemps que nous souhaitions;
Tes brises douces, ton soleil
A nos rêves donnent l'éveil.
Art et Beauté sont ton essence
Tu donnes au monde, un coeur, France!

Et quoi de ta flamme d'espoir
Illuminant un ciel trop noir?
Tes grands guerriers furent de taille
A dominer toute bataille;
Et ton drapeau flotte, exalté,
Au ciel de la fraternité.
Notre rêve est de cette essence
Donnant un coeur au monde, ô France!

D. B. STEINMAN

(Ingénieur de profession, M. Steinman habite New York City. Le poème que voici est extrait de "The American Bard", avec l'autorisation personnelle de l'auteur. R. D.-L.)

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Caravan

May-June 1959

The Harp

Five stories high above a city street
He dwelt, a child with wonder in his eyes.
For him, through winter cold and summer heat,
The sunbeams danced and stars sang lullabies.

One day, as if on wings, a stranger came
And stood within the room, unheralded.
Gently he spoke, calling the boy by name:
"David, play on your harp!" he softly said.

How did the stranger guess the secret dream
That, day and night, within the child's heart burned?
Outside the window, in the sunset gleam,
Glittered the instrument for which he yearned:

A bridge! The cables swung across the bay,
The strands that hummed like harp-strings murmuring,
They whispered to the child, "Some day..Some day.."
"There is my harp, sir. I can hear it sing!"

- D. B. Steinman

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Wisconsin Poetry Magazine

July - August, 1959

MICHIGAN THE BEAUTIFUL

Michigan the Beautiful!
Paradise the red man knew,
Where the deer still range the greenwood
And the lakes reflect the blue.

Michigan the Beautiful!
Where the smoke of campfires curled,
Now a thousand wheels are humming
Day and night to serve the world.

Michigan the Beautiful!
Haven of the heart's desire;
Smiling farms and gleaming cities
Keep alight our Freedom's fire.

Michigan the Beautiful!
Land of forest, lake and stream,
Home of sturdy pioneers,
Builders of the Western Dream.

—*David B. Steinman*

The Evening News

SAULT STE. MARIE, MICHIGAN WEDNESDAY, MAY 27, 1959

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Will Honor Dr. Steinman

SYRACUSE, N. Y.—Dr. David B. Steinman, internationally known bridge engineer, will be one of six prominent men in the fields of industry, education, theology and science to be awarded an honorary degree at Syracuse University's 105th Commencement, June 1.

Dr. Steinman, who will receive a Doctor of Engineering degree, has been designing or consulting engineer in the construction of more than 440 bridges on five continents, including the world's largest bridge project, the $100,000,000 Mackinac Bridge, Michigan.

He has received eight artistic bridge awards for the most beautiful bridges in America. Among the most notable of his bridges are the suspension bridge at Florianapolis, Brazil; Carquinez Straits Bridge, Calif.; St. John's Bridge, Portland, Ore.; Henry Hudson Bridge, Thousand Islands International Bridge.

During his 39 years of private practice, Dr. Steinman has become a recognized authority on long-span bridges, the design of suspension bridges and aerodynamic analysis of suspension bridges. His inventions and improvements have contributed greatly to bridge design and construction.

Recipient of 350 honors, Dr. Steinman holds the highest award of the Scientific Research Society of America for his research and inventions in suspension bridge aerodynamics and the Kimbrough Gold Medal, highest award of the American Institute of Steel Construction.

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THE POST-STANDARD

SYRACUSE, N. Y., TUESDAY, JUNE 2, 1959

Famed Men In 6 Fields Get Honorary Degrees

Chancellor William P. Tolley conferred honorary degrees on six distinguished persons at the 105th Syracuse University Commencement in Archbold Stadium yesterday.

The recipients and their citations, in part, were:

DAVID BARNARD STEINMAN, bridge-builder on five continents, inventor, scientist, and mathematician, educator, prolific contributor to knowledge, and gifted poet, you are an example of the possibilities of the full life for all who can and will live it.

Having taken your bachelor of science degree "summa cum laude" at the City College of New York and your civil engineer, master of arts and Ph.D. degrees at Columbia, you went into private practice in 1920.

Since that year, you have been designing or consulting engineer in the construction of more than 440 bridges—among them, the Florianopolis Bridge in Brazil, which is the largest in South America; the Henry Hudson Bridge in New York, and Thousand Islands International Bridge. And you have recently completed another international bridge, that over the St. Lawrence Seaway, as well as the world's largest bridge, the Mackinaw Bridge in Michigan. You are now engaged on plans for an international bridge at Saulte Sainte Marie (Mich), and for an intercontinental bridge over the Bosporus, as well as for a long-span steel-arch bridge in Paskistan.

You are the author of a number of standard books on bridge design and construction as well as of the biographical work, "The Builders of the Bridge," and author, also of more than 600 technical papers and inspirational articles. Furthermore, an accomplished poet, you have published two volumes of verse and have seen your poems printed in many periodicals of national or international circulation. And you have promoted the cause of poetry by founding visiting-poets series at four universities as well as by serving as an officer of the Poetry Society of America and similar organizations. As founder and president of the David B. Steinman Foundation, you have provided grants for research, education, and student aid.

For your far reaching achievements, you have earned many and diverse honors. Eight of your bridges have won the annual award for the most beautiful in America.

X. TG 140
S 8

CHEBOYGAN DAILY TRIBUNE

CHEBOYGAN, MICHIGAN — TUESDAY, MAY 19, 1959

Mackinac Bridge Designer Writes Poem for Mich. Week

LANSING — One of the world's foremost bridge designers, Dr. D. B. Steinman, the man who designed the Mackinac bridge which links Michigan's two peninsulas, and many other structures in various parts of the world, has given Michigan a fine gift for its Michigan Week celebration which started Sunday. The gift is his poem, "Michigan The Beautiful," in which he shows that his love of beauty is carried out in the structures he designs, and in the wonders of nature, of which Michigan has such a bountiful amount.

A resident of New York City, Dr. Steinman has spent considerable time in Michigan and his poem reveals the impressions he has received from the joys of nature and the humming wheels of industry in this state.

Following is Dr. Steinman's poem, made public on the eve of Michigan Week.

Michigan The Beautiful
By D. B. Steinman

Michigan the Beautiful!
Paradise the red man knew,
Where the deer still range the greenwood
And the lakes reflect the blue.

Michigan the Beautiful!
Where the smoke of campfires curled,
Now a thousand wheels are humming
Day and night to serve the world.

Michigan the Beautiful!
Haven of the heart's desire;
Smiling farms and gleaming cities
Keep alight our Freedom's fire.

Michigan the Beautiful!
Land of forest, lake and stream,
Home of sturdy pioneers,
Builders of the Western Dream.

X. TC 110
. S 8

the MAGNIFICAT

A Dream, A Song, A Prayer

D. B. STEINMAN

A bridge of strength and grace in mystic blend
Embodies spirit treasures that transcend
The steel and stone. The builder's dream is there,
Each curve a song, each soaring line a prayer.
A dream, a song, a prayer — these three combine
To make the bridge a beacon and a shrine.
So with our lives, O Builder of our Span
Help us to weave these strands into Thy plan
In threefold blend: a dream to point the goal;
A song to lift the heart; a prayer, the soul!

JANUARY, 1959

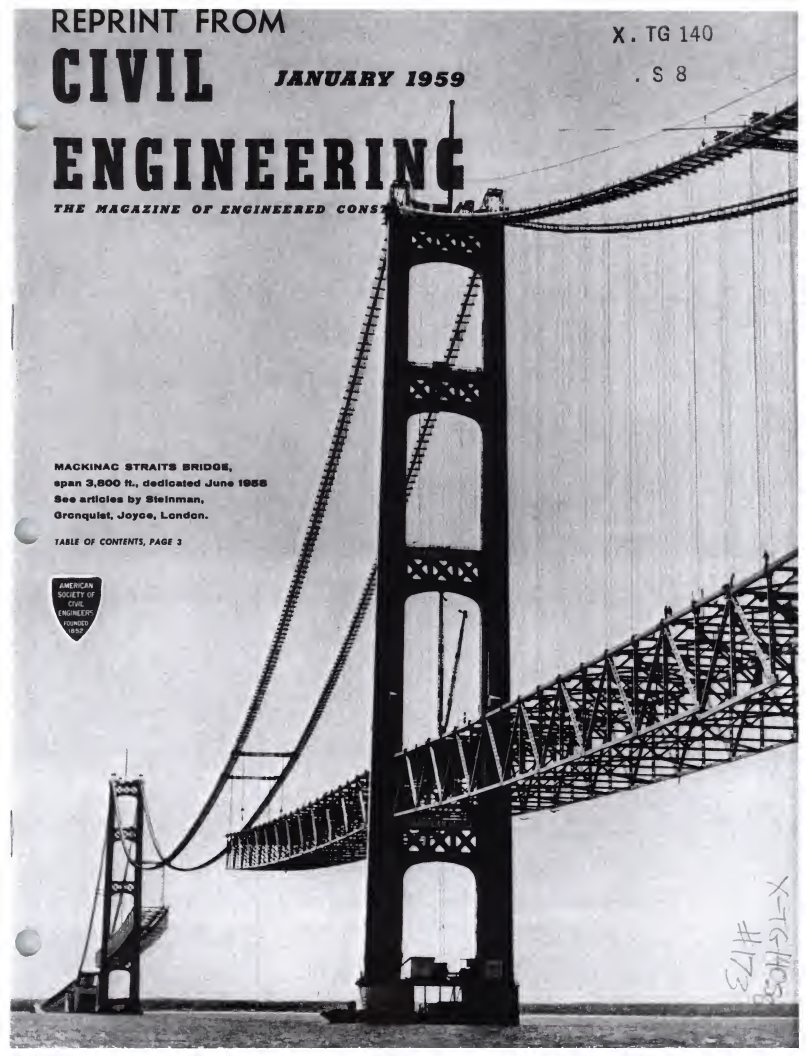
X. TG 140
. S 8

REPRINT FROM

CIVIL ENGINEERING

JANUARY 1959

THE MAGAZINE OF ENGINEERED CONST



MACKINAC STRAITS BRIDGE,
span 3,800 ft., dedicated June 1958
See articles by Steinman,
Granquist, Joyce, London.

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AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

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COLUMBIA

engineering alumni times

JUNE—JULY 1959

The Class Notebook

1909 — The David B. Steinman Festival of Arts was held for a second year at St. Lawrence University in Canton, New York during the month of March. This Festival, sponsored by one of our active Engineering alumni, has been enthusiastically received not only by St. Lawrence University but also by the residents of the surrounding area.

ENGINEERING NEWS-RECORD

D. B. Steinman: What measure for this man?

A McGRAW HILL PUBLICATION

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY
HOUGHTON • MICHIGAN

FRANK KEREKES
DEAN OF THE FACULTY

X. TG 14
. S 8

July 2, 1959

RECEIVED
JUL
D. B. STEINMAN

Dr. D. B. Steinman
Consulting Engineer
117 Liberty Street
New York, New York

Dear Dave:

"What Measure for This Man?" in Engineering-News Record, June 25, 1959, vividly brings to my mind the many personal contacts it has been my privilege to have with you since the Summer of 1925 when I was employed as a bridge computer by you.

Your intense and high devotion to the advancement of bridge engineering as an art, a science, and an engineering adventure founded upon your equally high standards of professional responsibility are in my mind the measure of your outstanding contributions not only to civil engineering, to these United States of America, but to the world. In all these high achievements you have been guided by humanitarian motives and ideals. Thus, I add my humble tribute to a great engineer and a great person and a great humanitarian.

Sincerely yours,

Frank Kerekes

Frank Kerekes

FK/mfr

X. TG 140
. S 8

NSPE
1934-1959

A QUARTER OF A CENTURY

OF PROFESSIONAL

GROWTH

19341938 *the formative years*

THE National Society of Professional Engineers was founded in 1934. Its organizational impetus grew out of an increasing desire on the part of a growing number of engineers for a profession-wide engineering group, as distinct from the existing engineering societies which drew their membership from one specialized field.

Invitations to discuss such a profession-wide society were extended by Dr. David B. Steinman, world-renowned bridge designer, and on May 25, 1934, representatives from the New York, New Jersey, Pennsylvania, and Connecticut state engineering societies met in the Memorial Room of the Columbia University Club in New York City to consider the formation of the National Society of Professional Engineers.

The structure of the proposed organization, as outlined by Temporary Chairman Steinman, was to include restriction of membership to registered professional engineers, and a three-level participation in which each member would be a member of the National Society, his state society, and his local chapter.

A second organizational conference of the new group was held in New York City on September 3, 1934. In the preamble to the National Society constitution adopted at that meeting can be seen the basic concept of service upon which the NSPE program has been erected:

> Recognizing that service to society, to state, and to profession is the premise upon which individual opportunity must be built, the National Society of Professional Engineers does herewith dedicate itself to the promotion and protection of the profession of engineering as a social and economic influence vital to the affairs of men and of these United States.

Before this second organizational meeting adjourned, Dr. Steinman was elected as the first NSPE president. His fellow officers were Major T. W. Battin, Pennsylvania, 1st vice president; Col. Hugh A. Kelly, New Jersey, 2nd vice president; and Willard S. Conlon, Connecticut, treasurer. T. Keith Legare, South Carolina, was appointed executive secretary. On December 10, 1934, the National Society of Professional Engineers was incorporated in South Carolina as a nonprofit organization.

David B. Steinman
First President of NSPE
1934-1936

X. TG 140
. S 8

The Detroit Free Press

THURSDAY, MAY 7, 1959

CONTEST ON

Did You Snap Big Mac?

ST. IGNACE—Photographers wishing to enter the $1,000 prize contest for architectural photographs of the Mackinac Bridge have only until June 1 to get into the swim.

First prize is $500. There will also be a second prize of $250, two third prizes of $50 each and six fourth prizes of $25 each.

Dr. David B. Steinman, famed designer of the Mackinac Bridge is the donor.

* * *

DRAMATIC photographs featuring the suspension span are desired. No boats, vehicles, or people should be prominent in the foreground.

Taking photographs from the bridge deck will not be permitted.

All entries, which must be unmounted 8x10 glossy prints, should be addressed to Photo Contest, Mackinac Bridge Authority, St. Ignace, Michigan, and must be postmarked before midnight, June 1, 1959.

Winners will be announced June 30, 1959.

Here's Another: Deadline June 1

ST. IGNACE — Deadline for entries in the $1,000 Mackinac Bridge photo contest has been extended to June 1, 1959.

The original deadline was Nov. 1, 1958, but officials decided contestants might need more time since painting has been completed on the towers.

Prints must be black and white, 8x10, glossy, unmounted. First prize is $500; second, $250; third, two of $50 each and six fourth, $25.

Entries must be addressed to: Photo Contest, Mackinac Bridge Authority, St. Ignace, Mich., before midnight June 1, 1959. Winners will be announced June 30, 1959.

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CIVIL ENGINEERING

JUNE 1959

ASCE Prizes and Awards Are Announced by Board

Ernest E. Howard Award

DAVID B. STEINMAN, M. ASCE, "for his signal contribution towards the advancement of bridge analysis and design, to the theory of the suspension bridge and its aerodynamic stability, and especially for his outstanding work in the design of the Mackinac Bridge."

NEWS OF ENGINEERS

D. B. Steinman at the honors convocation at Hunter College in New York City on April 29 was presented with the President's Gold Medal for Distinguished Service. On June 1 Syracuse University will award Dr. Steinman, internationally known bridge engineer, the honorary degree of doctor of engineering, his twentieth doctorate.

X. TG 140
. S 8

The American Bard

Night-Blooming Water Lily

Lily, refulgent in petals of white,
Fair ballerina, enchanting the night,
Kissed by the moonlight, you slowly unfold
Beauty, in bodice of velvet and gold.

Motionless . . . quivering . . . held in a
trance . .
Dew-spangled, twinkling like stars in your
dance,
Raptured, you sway to the nightingale's
tune,
Turning your face to your lover, the moon.

New York — *David B. Steinman*

July, August, September, 1959

X. TG 140
.S 8

Book Provides More Inland Sea Lore

MICHIGAN WRITER TELLS NEW STORY OF BRIDGE, DESIGNER

X. TG 140
. S 8

ESCANABA DAILY PRESS

TUESDAY, JULY 7, 1959

THIS PICTURE, of the world's greatest bridge was worth five hundred dollars to Ronald J. Wilson, St. Ignace, first prize winner in Mackinac Bridge photo contest sponsored by Dr. D. B. Steinman, famed designer of the structure. Wilson made the photograph with a Leica M-3 camera, on panatomic-x film. Second prize of two hundred fifty dollars and a third prize of fifty dollars were both won by Harold Bell, a Lansing professional photographer. The six winners of fourth prizes of twenty five dollars were: Jack M. Richards, Ferndale; Paul Ihde, Menominee; Maury Strahl, East Lansing; Jack M. Richards, Ferndale; Don Millard, Port Huron; and Harry Erickson, Muskegon.

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JOURNAL
OF THE
AMERICAN
CONCRETE
INSTITUTE

JUNE 1959

Steinman honored by Hunter and Syracuse

At the honors convocation at Hunter College in New York City on April 29, the President's Gold Medal for distinguished service, was presented to David B. Steinman, internationally famous bridge engineer.

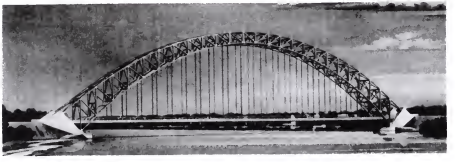
At commencement ceremonies at Syracuse University on June 1, the honorary degree of Doctor of Engineering was conferred on Dr. Steinman. This is his 20th honorary degree.

ENGINEERING
NEWS-RECORD

X. TG 140
. S 8

August 20, 1959

International



Trussed Arch Will Span Indus

The Government of Pakistan will call for world-wide bids on September 18 for construction of a steel truss arch railroad bridge over the Rohn Channel of the Indus River near Sukkur.

The bridge will have a span of 806 ft, 9 in. between end pins. The rise of the bottom rib will be 180 ft and the distance between the two ribs at the crown will be 24 ft.

It will be the ninth longest steel arch in the world, according to its designer, D. B. Steinman, New York City consulting engineer.

Mr. Steinman estimates that the bridge will cost $3 million and take 20 months to erect. It will be paid for from funds allocated by the International Bank for Reconstruction and Development for the rehabilitation of Pakistan's railroad system.

Although designed as a railroad bridge, the new Rorhi Channel span will have a concrete deck, flush with the rails, that can carry motor traffic in time of emergency. Specifications call for the use of British Standard steel.

The new bridge will be erected 100 ft downstream from the 70-year-old Lansdowne Bridge and replace it for railway traffic.

Men and Jobs

Honors

Ray M. Boynton has been awarded the honorary degree of Doctor of Engineering by the University of Maine. A graduate of the university, he has been for 30 years an associate of Dr. D. B. Steinman, consulting engineer, New York City. Dr. Boynton designed and supervised the substructure and main towers of the Mackinac Straits Bridge, Michigan, Sukkur Arch Bridge, Pakistan, and the Bosporus Suspension Bridge, Turkey.

SCIENCE NEWS LETTER

May 9, 1959

X. TG 140
S&

Bridges Made Safe

It has taken a major catastrophe and several near disasters to stimulate the development of bridge aerodynamics which is making bridges safe.

By RALPH SEGMAN

"BIG MAC"—With the world's second longest span, 3,800 feet, the new Straits of Mackinac Bridge is built to shrug off the most powerful winds ever recorded. Considered the safest suspension bridge, it is also the longest, from anchorage to anchorage.

X. TG 140
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THE BAY CITY TIMES

BAY CITY, MICHIGAN, FRIDAY, MAY 15, 1959

'Big Mac' Designer Writes State Ode

ANN ARBOR — (UPI) — Dr. David Steinman, who has done much to publicize Michigan by designing the Mackinac bridge, now has turned to poetry to describe the state.

Steinman's poem, "Michigan the Beautiful," will be presented during Michigan Week by University of Michigan President Harlan Hatcher, chairman of the cultural activities board of Michigan Week.

Steinman also said he would fly a Michigan flag from the window of his New York office next week to celebrate Michigan Week.

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A German Edition

The editors have received a copy of a German edition of Dr. David B. Steinman's book, "The Builders of the Bridge," that most interesting and informative book published in 1945.

The German title of the book is "Brucken fur die Ewigkeit," published by the Werner-Verlag in Dusseldorf. It is the biography of Johann and Washington Roebling, father and son, builders of the Brooklyn bridge. The elder Roebling was of German birth.

Dr. Steinman, in the preface to the German edition, voices the hope that the printing will contribute toward a lasting bridge of international understanding between the U.S. and Germany.

Bridgebuilder Honored

At the Honors Convocation at Hunter College in New York City on Wednesday, April 29, the President's Gold Medal for Distinguished Service was presented to David B. Steinman, internationally famous bridge engineer.

At the Commencement Ceremonies at Syracuse University on June 1, the honorary degree of Doctor of Engineering will be conferred upon Dr. Steinman. This will be the bridgebuilder's twentieth honorary degree. He now holds honorary doctorates in Science, Engineering, Literature, Humanities, and Laws, from leading universities on three continents.

PROFESSIONAL ENGINEER

May 31, 1959

X- TC 140
S8

NEWS BRIEFS . . .

New Bridge Over Soo Canal Planned

Engineering recommendations for a long-discussed bridge to connect the United States and Canada (Michigan and Ontario) at Sault Ste. Marie have been prepared by D. B. Steinman, M.ASCE, New York City consulting engineer. The proposal is being studied by Michigan and Ontario highway officials and the International Bridge Authority, a body created by the State of Michigan.

The plan calls for a two-lane, 12,000-ft-long structure (counting approaches) with 2-ft emergency walkways on both sides. The river spans carrying the roadway over the American and Canadian ship canals would total 4,810 ft in length. The approaches on the American side would cover 4,165 ft, and on the Canadian side 3,045 ft. The crossing would require 67 piers, to be founded in sandstone rock. Maximum water depth is 20 ft. The bridge would cost $18,198,000, and require eighteen months for construction.

The report considered the possible alternative of a 4,805-ft tunnel in making the international traffic connection. The cost of such a tunnel was estimated at $27,500,000, and construction time was put at thirty-six months.

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.58

A Message from Pres. Dunn on NSPE's Silver Anniversary

A QUARTER of a century ago a small group of engineers gathered in the Memorial Room of the Columbia University Club in New York City to consider the formation of the National Society of Professional Engineers. Few at that meeting could have realized the immense growth that lay ahead for both the Society they were founding and the engineering profession as a whole. Today we can look out on an NSPE membership of some 50,000 engineers in fifty state societies and nearly 400 local chapters. The National Society has its headquarters in its own building in Washington, D. C. Nearly 55,000 copies of this magazine are printed and circulated each month. Other NSPE publications on a variety of topics are regularly distributed to industrial executives, educational people, government officials, and individual engineers.

SUCH a listing of the physical "equipment" of the National Society could go on and on for several pages. But much more important, I believe, is a listing which would show the dedication to the concept of service which has always been in the background of NSPE activities. This concept is perhaps expressed most adequately in the preamble to the National Society Constitution adopted in the second organizational meeting of the NSPE founders in 1934:

> "Recognizing that service to society, to state, and to profession is the premise upon which individual opportunity must be built, the National Society of Professional Engineers does herewith dedicate itself to the promotion and protection of the profession of engineering as a social and economic influence vital to the affairs of men and of these United States."

THE best yardstick of the National Society's accomplishments over the past twenty-five years would be a comparison of the extent to which these accomplishments measure up to the ideals of service as called for in the above quotation.

DURING this Silver Anniversary year, we might ask ourselves what lies ahead for the next quarter of a century of NSPE growth and development. The answers to this question may in large part depend on how much influence we are able to bring to bear on the younger generation now in the engineering schools. For it is, of course, these young engineers who must shoulder the responsibility of building upon the foundation of professionalism which has now been erected.

IN the first issue of the AMERICAN ENGINEER magazine in January, 1935, Dr. D. B. Steinman, first NSPE president, wrote an article in which he stated that "the ultimate scope of potential accomplishment of the National Society transcends present realization." I feel that this statement is just as valid today as we look toward the next twenty-five years. Engineering and the sciences have changed the face of the earth and are now altering the composition of the space around our planet. The golden anniversary of the National Society will surely be observed at a time when engineering achievements will have transported man out into the solar system and beyond.

LET it be our hope and prayer, then, that the individuals who are charged with the responsibility of guiding National Society policy and activity through the next generation will hold themselves unswervingly to the task of building for the kind of profession which will face up to the challenges of the times.

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MICHIGAN WEEK OFFICE
110 Stevens T. Mason Building
Lansing, Michigan - May 14, 1939

LANSING, MAY 14_____One of the world's foremost bridge designers, Dr. D. B. Steinman, the man who designed the Mackinac bridge which links Michigan's two peninsulas, and many other structures in various parts of the world, has given Michigan a fine gift for its Michigan Week celebration starting Sunday, May 17. The gift is his poem, "Michigan The Beautiful," in which he shows that his love of beauty is carried out in the structures he designs, and in the wonders of nature, of which Michigan has such a bountiful amount.

A resident of New York City, Dr. Steinman has spent considerable time in Michigan and his poem reveals the impressions he has received from the joys of nature and the humming wheels of industry in this state.

Following is Dr. Steinman's poem, made public on the eve of Michigan Week.

MICHIGAN THE BEAUTIFUL

By D. B. Steinman

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Paradise the red man knew,
Where the deer still range the greenwood
And the lakes reflect the blue.

Michigan the Beautiful!
Where the smoke of campfires curled,
Now a thousand wheels are humming
Day and night to serve the world.

Michigan the Beautiful!
Haven of the heart's desire;
Smiling farms and gleaming cities
Keep alight our Freedom's fire.

Michigan the Beautiful!
Land of forest, lake and stream,
Home of sturdy pioneers,
Builders of the Western Dream.

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MW 9.5:27

Syracuse University
ALUMNI NEWS

X. TG 140
. S 8

Commencement 1959

Honorary Degrees

DAVID BARNARD STEINMAN, bridge builder on five continents, inventor, scientist, and mathematician, educator, prolific contributor to knowledge, and gifted poet, you are an example of the possibilities of the full life for all who can and will live it.

Having taken your Bachelor of Science degree "summa cum laude" at the City College of New York and your Civil Engineer, Master of Arts and Ph.D. degrees at Columbia, and having served as Professor of Civil Engineering at the University of Idaho and as Professor of Civil and Mechanical Engineering at City College, you went into private practice in 1920. Since that year, you have been designing or consulting engineer in the construction of more than four hundred and forty bridges — among them, the Florianopolis Bridge in Brazil, which is the largest in South America; the Mount Hope Bridge in Rhode Island, the St. John's Bridge in Oregon, the Carquinex Straits Bridge in California, the Henry Hudson Bridge in New York, the Constitution Bridge in Puerto Rico, the Thousand Islands International Bridge, the Baghdad Bridge over the Tigris River in Iraq, the Kingston Bridge across the Hudson River, the Raritan River Bridge in New Jersey, and the Connecticut Turnpike Bridge in New Haven. And you have recently completed another international bridge, that over the St. Lawrence Seaway, as well as the world's largest bridge, the MacKinac Bridge in Michigan. You are now engaged on plans for an international bridge at Saulte Sainte Marie and for an intercontinental bridge over the Bosporus, as well as for a long-span steel-arch bridge in Pakistan.

You are the author of a number of standard books on bridge design and construction as well as of the biographical work *The Builders of the Bridge*, and author, also of more than six hundred technical papers and inspirational articles. Furthermore, an accomplished poet, you have published two volumes of verse and have seen your poems printed in many periodicals of national or international circulation. And you have promoted the cause of poetry by founding visiting-poets series at four universities as well as by serving as an officer of the Poetry Society of America and similar organizations. As founder and president of the David B. Steinman Foundation, you have provided grants for research, education, and student aid.

For your far reaching achievements, you have earned many and diverse honors. Eight of your bridges have won the annual award for the most beautiful in America. You have twice received the Norman Medal, the highest award of the American Society of Civil Engineers; and, in 1952 and 1954, the highest awards of the National Society of Professional Engineers and of the Scientific Research Society of America. American and foreign universities have given you honorary degrees, while other tributes, too numerous for mention, have been paid to you both in our country and abroad.

And now, by action of the University Senate, the Board of Trustees concurring, and by virtue of the authority vested in me by the University of the State of New York, I confer upon you the degree of Doctor of Engineering, *honoris causa*.

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.S8

SOCIETY for the HISTORY of TECHNOLOGY Newsletter June 1959

Secretary: Dr. Melvin Kranzberg, Room 315, Main Bldg. Case Institute of Technology

DR. STEINMAN ASSUMES PRESIDENTIAL DUTIES

In compliance with our constitution, the duties of the President have fallen upon Dr. David B. Steinman, our First Vice President.

Dr. Steinman is one of the world's leading engineers. He has revolutionized the artistic, engineering, and scientific aspects of bridge building in the more than 400 bridges he has built on five continents. The recipient of 18 honorary degrees in science, law, engineering, and letters, he has been president of the International Society of Professional Engineers, the New York Academy of Sciences, and the National Society of Professional Engineers. In addition, he has received many awards and honors for the bridges he has constructed. His most recent work is the $100,000,000 Mackinac Bridge, the longest suspension bridge in the world, and he is now engaged in a suspension bridge over the Tigris River at Baghdad, and one over the Bosporus to connect Europe and Asia. He is the author of many works on bridges and their builders.

X-TG140
.S8

"Mighty Mac" Truly an Immovable Object

X-TG 140
.S8

KINGS COUNTY
PROFESSIONAL ENGINEER

MAY, 1959

DR. STEINMAN AGAIN HONORED

Dr. Steinman who holds honorary doctorates in Science, Engineering, Literature, Humanities, and Laws from leading universities in three continents, will be the recipient of yet another honorary degree of Doctor of Engineering at the Commencement Ceremonies of Syracuse University on June 1, 1959. This will be the Doctor's twentieth honorary degree.

The noted philanthropist and bridge builder, whose endowments for engineering scholarships have endeared him to the engineering profession, has recently submitted his design for the $18,198,000 International Bridge at Soo, carrying a two lane roadway over the American and Canadian ship canals, which was recommended for adoption by the authorities concerned.

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SYRACUSE UNIVERSITY

DAVID BARNARD STEINMAN, bridge-builder on five continents, inventor, scientist, and mathematician, educator, prolific contributor to knowledge, and gifted poet, you are an example of the possibilities of the full life for all who can and will live it.

Having taken your Bachelor of Science degree "summa cum laude" at the City College of New York and your Civil Engineer, Master of Arts, and Ph.D. degrees at Columbia, and having served as Professor of Civil Engineering at the University of Idaho and as Professor of Civil and Mechanical Engineering at City College, you went into private practice in 1920. Since that year, you have been designing or consulting engineer in the construction of more than four-hundred and forty bridges--among them, the Florianopolis Bridge in Brazil, which is the largest in South America; the Mount Hope Bridge in Rhode Island, the St. John's Bridge in Oregon, the Carquinex Straits Bridge in California, the Henry Hudson Bridge in New York, the Constitution Bridge in Puerto Rico, the Thousand Islands International Bridge, the Baghdad Bridge over the Tigris River in Iraq, the Kingston Bridge across the Hudson River, the Raritan River Bridge in New Jersey, and the Connecticut Turnpike Bridge in New Haven. And you have recently completed another international bridge, that over the St. Lawrence Seaway, as well as the world's largest bridge project, the Mackinac Bridge in Michigan. You are now engaged on plans for an international bridge at Saulte Sainte Marie and for an inter-continental bridge over the Bosporus, as well as for a long-span steel-arch bridge in Pakistan.

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The New York Times.

NEW YORK, THURSDAY, APRIL 30, 1959.

2 HONORED BY HUNTER

Engineer and Lawyer Get Gold Medals From College

The Gold Medal for Distinguished Service to Hunter College was presented yesterday to David B. Steinman, internationally known bridge engineer, and Leon Finley, international lawyer. The presentations were made by Dr. George N. Shuster, president of the college, at the school's Manhattan building at 695 Park Avenue.

Mr. Steinman established the Irene Steinman Scholarship Fund at Hunter in honor of his wife. He is known as a poet and benefactor of poets as well as an engineer.

Mr. Finley, the first president of the Hunter College Opera Association, established an annual scholarship at the college for a student from Germany.

X. TG 140
. S 8

Scimitar & Song

JULY, 1959

The Harp

D. B. Steinman

Five stories high above a city street
He dwelt, a child with wonder in his eyes.
For him, through winter cold and summer heat,
The sunbeams danced and stars sang lullabies.

One day, as if on wings, a stranger came
And stood within the room, unheralded.
Gently he spoke, calling the boy by name:
"David, play on your harp!" he softly said.

How did the stranger guess the secret dream
That, day and night, within the child's heart burned?
Outside the window, in the sunset gleam,
Glittered the instrument for which he yearned:

A bridge! The cables swung across the bay,
The strands that hummed like harp-strings murmuring,
They whispered to the child, "Some day. . Some day. . "
"There is my harp, sir. I can hear it sing!"

NEW YORK

Professional Engineer

May-June 1959 • Vol. 16 • No. 3

Engineer Extraordinary:

D. B. STEINMAN

- Past-president NYSSPE
- Founder of NSPE (1934)
- Renown bridgebuilder

X-TG140
.S8

The New York Times.

WEDNESDAY, JULY 29, 1959.

SECTIONS OF BRIDGE MEET IN NEW HAVEN

Special to The New York Times.

NEW HAVEN, July 27—The suspended sections of the second largest box-girder bridge in the United States were joined here today. The central part of the bridge is 378 feet long.

The sections were joined when workmen of the American Bridge Company set in place a fifty-nine-foot girder weighing ninety-eight tons. This was swung into position on the south side of the bridge. A similar girder will be installed on the north side later this week.

The bridge will carry the Oak Street connector road over fourteen mainline tracks of the New York, New Haven and Hartford Railroad just north of Union Station. It will link the Connecticut Turnpike with the heart of the city.

The bridge, which was designed by Dr. David B. Steinman of New York, is constructed of flanged girders fitted into one another to form squares or boxes that are linked together by a web of plates. The sections are built out from each side, girder boxes and plates riveted together, until joined in the middle. That is what was done today.

The only box-girder bridge in the country longer than this eight-lane highway span is one crossing part of New Haven Harbor and opened last year.

V-TG 140
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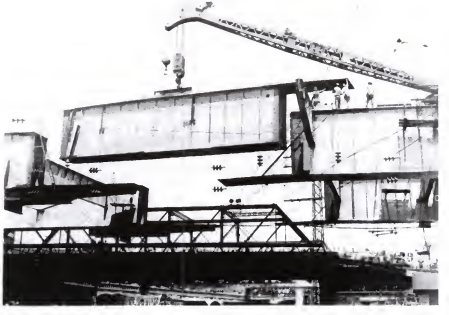

Closing Members Are Placed . . .

. . . In Long Box-Girder Span

The closing girders of the longest box-girder span in the United States have been set in place.

The bridge, part of the Oak Street connector in New Haven, Conn., is a three-span continuous unit with a center span of 378 ft 9 in. and side spans of 151 ft 6 in. Its two main girders are 21 ft 6½ in. deep at the piers, 12 ft 3½ in. deep beyond their haunches.

The structure is an important link in the high-speed road system connecting New Haven's city streets with the Connecticut Turnpike and with the main highway to Hartford, the state's capital. It will carry eight lanes of traffic across an electrified main line and terminal yard belonging to the New York, New Haven and Hartford Railroad.

In preliminary studies made to determine the most satisfactory and economical characteristics of a bridge across the tracks, an attempt was made to locate a pier in the center of the track right-of-way so as to shorten the required span.

But because train movements in the busy yard are automatically controlled, the relocation of tracks and utilities would have cost almost five times more than the amount that could have been saved by shortening the spans, regardless of the kind of bridge used. It was desirable, therefore, to keep piers outside the tracks.

Three types of structures were considered: a through-truss, a plate girder, and the box girder. Configuration of the tracks in the area of the proposed structure dictated in favor of the box-girder design. The way the tracks fan out would have required placing piers for either of the other two possible designs in such position that a long span would have been required.

The use of two through-trusses, set 120 ft apart, would have required a span length of 440 ft. A plate girder design using four girders for each half of the roadway would have cut the span to 410 ft. The box-girder design, with the girders closely spaced and the roadway carried on long cantilevered brackets outside them, permitted the reduction of the span to 378 ft 9 in.

The webs of each box girder vary in thickness from ½ to ¾ in. and are set 5 ft 6 in. on centers. The maximum flange section is made up of four 8 x 8 x ¾-in. angles, five cover plates, 86 x ¾ in., and one cover plate, 48 x ¾ in., for a total area of 404 sq in. exclusive of the webs. Low-alloy steel was specified and thickness was kept to a maximum of ¾ in.

Moment, shear, and deflection calculations include the effects of a future wearing surface weighing 25 lb per sq ft of roadway. To compensate for maximum dead load deflection the structure was designed with a center span camber of plus 13⅞ in. and an end span camber of minus 2⅛ in.

Due to the relatively short end span, there is an uplift at the abutments. To offset this uplift, counterweights of concrete are provided at the end floor beams. The abutments bearing these concrete weights measure 60 ft by 6 ft by 7½ ft and weigh 211 tons apiece.

D. B. Steinman of New York City was designing engineer. The foundation and other substructure work was done by C. W. Blakeslee and Sons, Inc. of New Haven and erection of structural steel was handled by American Bridge Co. Mariani Construction Co., New Haven, was general contractor.

ENGINEERING NEWS-RECORD

August 13, 1959

X-TC 140
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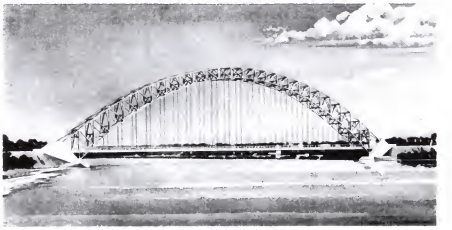
CIVIL ENGINEERING

MAY 1959
VOL. 29 • NO. 5

THE MAGAZINE OF ENGINEERED CONSTRUCTION

Long-Span Steel Arch Railroad Bridge for Pakistan



New railroad bridge over the Rohri Channel of the Indus River, near Sukkur, West Pakistan, will be the ninth longest steel arch in the world, when it is completed early in 1961. It will be a steel trussed arch with span of 806 ft 9 in. and total height of 204 ft. The project will replace a cantilever structure, the 70-year-old Landsdowne Bridge, which is now restricted to the lightest locomotives and speeds of 5 mph. The new bridge will carry one broad-gauge track, plus a 15-ft-wide concrete deck, for emergency use by military vehicles. D. B. Steinman, M. ASCE, is consulting engineer on the project for the Government of Pakistan.

X-TG-140
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NEW MEXICO
MAGAZINE
The Capitol Santa Fe, N. M.

June, 1959

TO MY PIPE

Sweet pipe, companion without peer,
Soothing purveyor of peaceful cheer!
Each puff I take, a healing balm,
Dispelling care, bestowing calm.

Relaxing in my easy chair,
I watch your smoke rise like a prayer.
Your wreaths ascend in misty hues
As incense to invoke my muse.

And like Aladdin's lamp, your bowl
Yields fabled treasure for my soul,
A magic carpet wafting me
To Xanadu and Araby.

—D. B. Steinman

X-TG140
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ACIER
STAHL
STEEL

24th YEAR **4** APRIL 1959

Book Review

Bridges and their Builders

by David B. Steinman and Sara Ruth Watson

402 pp., 5 in × 8 in, 49 illustr. Publ. Dover Publications Inc., New York, 1958. Price: $1.95.

As President Franklin D. Roosevelt once remarked, the history of bridge-building is very often identical with the history of civilisation. No one is better qualified to write this book than Dr. D. B. Steinman, a great engineer who has built some outstanding bridges.

Collaborating with Sara Ruth Watson, Dr. Steinman gives some very interesting details on the "static" architecture of the Greeks, the arched viaducts of the Romans, the ancient suspension bridges of China and South America, the massive bridges of the Middle Ages and, last but not least, the great steel and concrete bridges of modern times.

The achievements of a succession of famous bridge engineers—John Rennie, George Stephenson, W. J. M. Rankine, Benjamin Latrobe, James Eads, the Roeblings, Baker, Fowler, etc.—emerge from the pages of this interesting book.

G. N. B.

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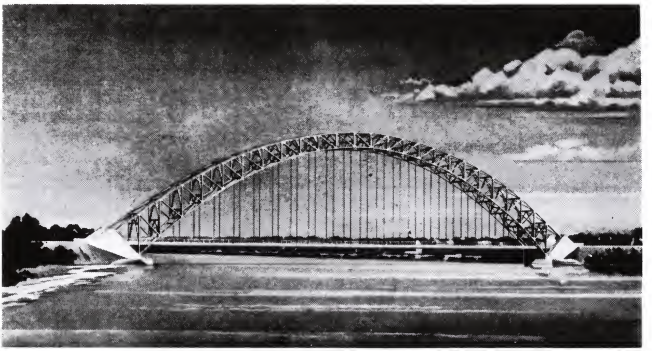
American Engineer

MAY 1959
Vol. 29, No. 5



A new D. B. Steinman bridge to be built in West Pakistan.

X. TG 140
. S 8

CITATION

Hunter College
Honors Convocation, April 29, 1959

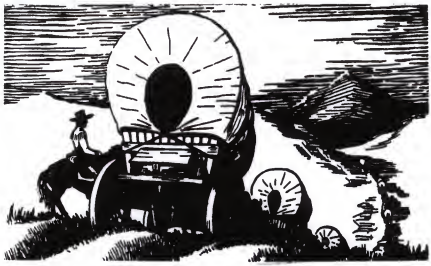
DR. DAVID BARNARD STEINMAN

Having graduated from the City College summa cum laude and pursued graduate study leading to the doctorate at Columbia University the distinguished engineer whom Hunter College is honoring today embarked on a career which is perhaps the most notable of its kind in the history of our country. Beautiful bridges which in the United States and on four other continents span rivers giving testimony to his knowledge and genius have acquired an almost legendary fame which finds one of its peaks in the quite marvelous bridge at Mackinac, now in process of completion -- surely a feat of engineering of which the Romans themselves would have been proud. But this master of the art of building has been notable always for his deep interest in and concern for humanistic education. Perhaps he sees in this his truest claim to distinction. It has led him to become a poet in his own right and a doer of good for poets as well. Fortunate in his choice of a charming Hunter College graduate as his bride, he has been a very generous benefactor to her Alma Mater. In particular we owe to his concern the establishment of the Irene Steinman Scholarship Fund. Hunter College honors itself in awarding to him the President's Medal for Distinguished Service.

* * * * *

April the twenty-ninth
Nineteen hundred fifty-nine

Caravan



X. TG 140
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Moment of Splendor

Evanescent
as a cresent
of the moon,
As fireflies hover
glimmering over
a blue lagoon,
Love is a tender
moment of splendor
dying too soon.

- D. B. Steinman

March-April
1959

X. TG 140
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ACIER
STAHL
STEEL

24e ANNEE 4 AVRIL 1959

Fig. 3. Pont sur le canal de Rohri près de Sukkur (Pakistan occidental).
Auteur du projet : Dr. D. B. Steinman.
Photo : Peter A. Juley & Son.

Un nouveau pont-rail au Pakistan (fig. 3)

Un nouveau pont-rail sur le canal de Rohri, dérivation de l'Indus, est actuellement en construction près de Sukkur dans le Pakistan occidental. Ce pont, œuvre du Dr D. B. Steinman, Ingénieur-Conseil de New York, est un arc métallique de 246 m de portée et de 55 m de flèche. Lorsqu'il sera terminé, le nouvel ouvrage occupera la neuvième place parmi les grands arcs métalliques du monde.

X. TG 140
. S 8

April 19, 1959

THE CHRISTIAN EVANGELIST

FRONT RANK

PERSPECTIVE

by D. B. Steinman

Flung from the fingers of Omnipotence,
The shimmering clouds of star-dust found their place
As whirling suns and planets, to commence
Their ordered orbits in the realms of space.

On one small orb amid these blazing stars,
A b l i n k i n g biped—Man—at length appears.
His Eden-earth soon racked by greed and wars,
He finds the Light to overcome his fears.

Of all creation in this vast design,
He scans the whole and glimpses the divine.

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We're Proud of Michigan

NEWS OF MICHIGAN

FOR RELEASE ANYTIME | SIXTH ANNUAL MICHIGAN WEEK — MAY 17-23 | APRIL 1959

Michigan's Mackinac Bridge is Like a Magnet

ST. IGNACE, Mich. — The Mackinac Bridge, which in many ways is like a magnet because of the number of visitors it attracts, is preparing for its second annual summer invasion of tourists.

Hundreds of thousands of persons from throughout the U.S. and abroad have come to Northern Michigan to see and cross the world's largest bridge.

Built at a cost of $100 million, the five-mile span was opened to traffic Nov. 1, 1957.

More than 4,000,000 persons riding in 1,400,000 automobiles, buses and trucks crossed "Big Mac" during the first year and about 5,000,000 persons will cross during its second year of operation.

Even before it opened to traffic, the Mackinac Bridge was one of the state's top tourist attractions. After it opened, it was officially named state's No. 1 tourist attraction in a survey conducted by the University of Michigan.

And the American Institute of Architects selected the Mackinac Bridge as one of the seven man-made wonders of the modern world.

Tourists who come to see "Big Mac" usually visit three other outstanding tourist attractions —they are among the Top Ten in Michigan—within a radius of 50 miles.

They include historic Mackinac Island, the famed Soo Locks at Sault Ste. Marie and the breath-taking Tahquamenon Falls, the largest waterfall east of the Mississippi with the exception of Niagara Falls.

Anyone who is a victim of agoraphobia—the morbid fear of crossing open space — needn't worry about crossing the Mackinac Bridge to visit the other attractions in the area.

The Mackinac Bridge Authority will provide a driver so that victims of agoraphobia can close their eyes. The Authority has provided this service for more than a dozen persons, including one burly truck driver who crouched in the rear of a Bridge patrol car under a blanket while an Authority maintenance man drove his truck across.

There's no extra charge for this service.

X-TC 140
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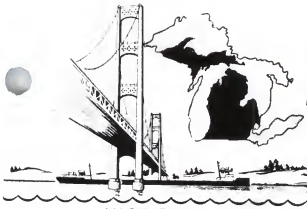

Michigan in Books

MICHIGAN STATE LIBRARY - SERVING MICHIGAN SINCE 1828

Spring, 1959

MICHIGAN IN POETRY

Dr. David B. Steinman, designer and engineer of the Mackinac Bridge, is a member of the Poetry Society of Michigan and a trustee of the Poetry Society of America, among his many other affiliations. His volume of poetry, I Built a Bridge, is witness to his belief that poetry is worthwhile and necessary:

"The light gleams on my strands and bars
In glory when the sun goes down.
I spread a net to hold the stars
And wear the sunset as my crown."

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The New York Times.

NEW YORK, TUESDAY, APRIL 21, 1959.

NEW SCIENCE AIDS SAFETY OF SPANS

Bridge Aerodynamics Used by Designer of Mackinac Link to Ban Wind Damage

On a windy November morning, the engineer in charge of the Tacoma Narrows Bridge rushed to the telephone. Alarmed at the rhythmic rise and fall of the 2,800-foot suspension span, the third longest in the world, he ordered stiffening wire ropes for immediate installation. When he returned, the span was gone.

Out of this death in 1940 of a four-month-old engineering masterpiece came the phoenix-like birth of a new science, bridge aerodynamics, according to Science Service.

In less than two decades, the science has reached perhaps its ultimate expression in the new Straits of Mackinac Bridge in upper Michigan. The bridge is the first utilizing the concept of "perfect aerodynamic stability."

The world's longest suspension bridge, 8,614 feet from anchorage to anchorage, "Big Mac" can withstand virtually infinite wind velocity. With its deck openings shut solid by ice and snow, it could shrug off a 632-mile-an-hour wind, a blow that is far beyond what will ever happen. What is more remarkable is this: the stronger the blow, the more rigid and resisting the bridge becomes.

The lesson learned from the Tacoma collapse was a shocking one, indeed, to bridge engineers who venerated the principle of flexibility in suspension spans. The Tacoma Bridge was the most flexible ever built and was hailed as one of the safest.

During its construction the motions of the span, even in gentle breezes, caused "seasickness" among the rugged workers. Yet, the supreme confidence of authorities, designers and builders was not shaken. Motorists seemed to enjoy the bouncing, swaying ride on the bridge they dubbed "Galloping Gertie."

Writhing Is Violent in Wind

Then came the 42-mile-an-hour wind, violent up-and-down oscillations and writhing. Like a narrow wooden ruler being twisted in opposite directions at each end, the span snapped. Tearing away from suspending cables, it crashed into Puget Sound more than 200 feet below.

The catastrophe was not unexpected to Dr. David B. Steinman, designer of hundreds of bridges, among them the Mackinac. He had previously suggested that the span be stiffened.

Before most of his profession had recognized aerodynamic oscillations as a problem, Dr. Steinman had begun to work on the solution. He recently said that some twenty bridges completed since 1930 have been subjected to disturbing or dangerous oscillations. At least two of them, the Golden Gate and the Bronx-Whitestone, have undergone costly stiffening, reconstruction.

Dr. Steinman credits John A. Roebling, designer of the Brooklyn Bridge more than ninety years ago, as being the first man to do something about aerodynamic instability. With an intuitive rather than scientific grasp of the problem, Roebling built his suspension spans using special stiffening methods. For nearly three-quarters of a century thereafter, this phase of bridge building was totally ignored.

Mere stiffening is not the best way to build large and safe suspension bridges, Dr. Steinman maintains that it is both more scientific and more economical to eliminate the cause of aerodynamic instability than to build heavy powerful structures to resist the force of the wind.

It is surprising that aerodynamics was not applied to bridges sooner since it has been utilized by aircraft designers from the beginning of the air age. Wings are shaped in such a way that the airflow around them produces a greater pressure on the under surface, thus a lifting force.

Similar forces act on bridge roadways which are supported by cables from above and a network of steel girders below. In a steady wind, the flexible span tends to oscillate up and down in harmony with the air pressure which acts rhythmically to force it up and then down. These oscillations are self-exciting and may, in a short time, grow violent in non-aerodynamic bridges.

Effect Is Demonstrated

Dr. Steinman performs a neat simple demonstration of this effect. Mounting half a solid sphere between two light springs he exposes the flat side to a stream of air from an electric fan. He pulls the half-sphere up or down slightly and lets go. The resulting small oscillation rapidly builds up into a violent one. When the round side of the half-sphere faces the fan, any oscillation that is started promptly damps out.

Employing this "round-side" principle, Dr. Steinman designed the Mackinac Bridge. As he described it:

"When the bridge floor is moving up, the resultant aerodynamic forces act down; and vice versa. As a result, any incipient vibration, as from traffic, is quickly brought to rest. The bridge actually utilizes the force of the wind to produce stability; the stronger the wind, the more stable the bridge."

As an added safety factor, the two inner traffic lanes are constructed of open steel grillwork, thus eliminating some of the solid surface that otherwise would be exposed to wind pressure. For the same reason, there are open slots at the far edges of the outer lanes.

Dr. Steinman believes that the design of the Mackinac Bridge permitted a saving of $15,000,000 in its construction—its total cost was nearly $100,000,000.

The finished structure represents to him a triumph of mathematics applied to bridge design and a towering symbol of greater bridges to come.

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New York Construction News

Monday, May 4, 1959

Hunter Honors David B. Steinman

At the Honors Convocation at Hunter College in New York City on Wednesday, April 29, the President's Gold Medal for Distinguished Service was presented to David B. Steinman, internationally famous bridge engineer.

At the Commencement Ceremonies at Syracuse University on June 1, the honorary degree of Doctor of Engineering will be conferred upon Dr. Steinman. This will be the bridgebuilder's twentieth honoring degree. He now holds honorary doctorates in Science, Engineering, Literature, Humanities, and Laws, from leading universities on three continents.

Reprinted from X-16190 58 #213

"WHO'S WHO IN ENGINEERING"

8th Edition—1959

STEINMAN, David Barnard, Cons. Engr., 117 Liberty St., N.Y. City; res. 305 Riverside Drive, N.Y. City.
Bridge Engr.; b. N.Y. City, June 11, 1886; ed. C.C.N.Y., B.S. (summa cum laude), 1906; award 12 medals and 3 yrs. fellowship in Mechs.; Columbia Univ. Sch. Engrg., C.E., 1909; awarded 2 yrs. scholarships in Applied Sci.; Columbia Univ., A.M., 1909; awarded 1 yr. grad. scholarship in engrg.; Ph.D., Columbia Univ., 1911; mem. Phi Beta Kappa; m. N.Y. City, 1915, Irene Hoffman; ch.: John Francis, Alberta, David. Miscel. engrg. wk., 1906-10; cons. engr. & prof., C.E., Univ. Ida., 1910-14; spl. asst. to Gustav Lindenthal, on Hell Gate Arch Bridge, N.Y. City, and other bridges, 1914-17; prof. C.E. & M.E., C.C.N.Y., 1917-20; cons. engr., bridge wk., 1920 to date, incl. bridges at: Florianopolis (Brazil) suspension (largest bridge in S.A.); Quebec Cantilever Strait (Calif.) cantilever; Mt. Hope (Bristol, R. I.); Waldo-Hancock (Penobscot Riv., Me.); Grand'Mere (Que.); St. Johns (Portland, Ore.); Sky Ride & Obs. Towers, 1933 Chicago Expn.; Henry Hudson (N.Y. City) and Thousand Islands (joining U.S. and Canada); Deer Isle (Maine); Marine Parkway (N.Y. City); Vancouver (B.C.); Deegan Blvd. Express Hwy., N.Y.C., 1945-50; Martin Pena Channel Bridge, P.R. 1950-51; Kingston-Rhinecliff Bridge over Hudson River, N.Y.; reconstrn. of old Brooklyn Bridge, N.Y., 1948-53; Rte. 4 Pkway. and Rte. 4 Bridges, N.J.; proposed bridge across Messina Strait, Italy; Mackinac Straits Bridge, Mich. 1953-57; Raritan River Bridge, N.J.; reconstrn. of Manhattan Bridge, N. Y.; and others in 5 continents; des. Karradah Bridge, Baghdad, Iraq., 1957-58; des. bridge across Bosporus, Turkey, 1957; Founder & pres., The David B. Steinman Foun.; lecturer on bridge des. at many colls. and univs. Awards and honors: Silver scroll from 11 engrg. socs. for contributions to advancement of engrg. 1932; Thomas Fitch Rowland Prize, Am. Soc. C.E. 1929; J. James R. Croes Medal, Am. Soc. C.E. 1939; Norman Medal, Am. Soc. C.E. 1923 and 51; Artistic Bridge Awards, Am. Inst. Steel Constrn. 1930, 32, 37, 38, 39, 42, 44, 55; Townsend Harris Medal 1934 and Alumni Service Medal 1936 from Assoc. Alumni of C.C.N.Y.; Alfred T. White Prize, Brooklyn Engrs. Club 1934; Prize for Vow of Svc., adopted for engrg. profn., Am. Assn. Engrs. 1926; medal for outstanding civic contrn. (reconstrn. of Bklyn. Bridge) by Greater N.Y. Civic Center Assn. and 55 civic, archtl. and scientific orgns. 1950; highest award of N.S.P.E. 1952; testimonial Scroll by Alumni and Friends of Madison House 1952; Distinguished Service Scroll, Nat. Council State Bds. of Engrg. Examiners 1949; Cert. of Cooperation, U.S. Mutual Security Agency 1952; Eloy Alfaro Cross, Republic of Panama; Hon. D.C.E., Univ. Bologna, Italy 1953; D.Sc., Minerva Univ., Italy 1953; Hon. D.Sc. Univ. Ghent (Belgium) 1953; hon. mem. Free French War Veterans; Cross of Comdr., Grand Prix Humanitaire de Belgique 1952; Cross of Knight of Honor et des Chevaliers de la Croix de Lorraine, Paris 1952; Hon. Companion of the Resistance of the Order des Chevaliers de la Croix de Lorraine des Compagnons de la Resistance, Paris 1952; hon. mem. Legion Belge; Knight Comdr. (with Star) of the Order of the Gold Phoenix, with Chapter of Cyprus and Jerusalem, Rome 1952 (founded 1199 A.D.); hon. mem., French Legion of Honor, 1954; Grzowski M., Engrg. Inst, Can., 1957; Goeth.ls M., S.A.M.E., 1957; Levy M., Franklin Inst., 1957; Kimbrough M., Am. Inst. Steel Constr., 1957; 18 honorary degrees from U.S. & foreign univs. Accademia di Filosogia Classica, Rome, 1952. Author of a number of books on bridge constrn.; number of treatises and tech. papers, 1911 to date; contbr. to Encyclopedia Britannica, Encyclopedia Americana, Colliers Encyclopedia; num. arts. in A.S.C.E. Trans. and other engrg. jours.; profl. writings translated into for. langs. Pres. Am. Assn. Engrs. 1925-26, life mem., chmn. Civic Com., N.Y. Chapt. 1926-27, Edtl. Com. 1926-27; founder and pres. Natl. Soc. Profl. Engrs. 1934-36; pres. Natl. Council State Bds. of Engrg. Exams., 1931-32, v.p. 1930-31, chmn. Com. of Exams. 1930-33; pres. N.Y. State Soc. Profl. Engrs. 1930-33, chmn. Bd. of Tr. 1933-43, 1948-49, life mem.; chmn. N.Y. State Bd. of Exams. for Profl. Engrs. 1933-35, 1941-43, 1945-47, vice chmn. 1952-53; chmn. Struct. Div., Am. Soc. C.E. 1931-33, chmn. Local Mem. Com. 1929-37, mem. Exec. Bd., Struct. Div. 1929-34, Pub'ns. Com., Struct. Div. 1930-32, Com. on Steel 1929-31, chmn. Profl. Relations Com., N.Y. Sect. 1934-41, v. chmn. 1950-51, chmn. 1951-52 Com. on Reg. of Engrs.; v. chmn. N.Y. State Bd. of Licensing for Profl. Engrs. and Land Surveyors 1931-33, mem. 1930-41; mem. Ex.c. Com., Engrs. Council for Profl. Devel. 1933-39, Com. on Profl. Recognition 1933-41; founder and pres., Am. Toll Br. Assn. 1932-34; pres. N.Y. Acad. of Sci. 1952-53, life fellow, mem. Council 1951-53; chmn. U.S. Council of Internat. Assn. of Br. & Struct. Engrs. 1950-51; chmn. N.Y. State, Nat. Com. for Trade Recovery 1933-34; pres. Pan Am. Public Works, Inc.; v.p. Togg-Nichols Br. Co., Smithboro Br. Co.; dir. Independence Br. Co., Interboro Br. Co. Mem. Com. on Bridge Legislation, Am. Engrg. Council 1930-34; mem. Engrg. Inst. of Canada, Am. Ry. Engrg. Assn., A.S.T.M., Am. Concrete Inst., Am. Mil. Engrs., Munic. Engrs. of N.Y., A.S.E.E., S.A.E., Am. Math. Soc., Acad. Polit. Sci., Corp. of Profl. Engrs. of Prov. of Que., Profl. Engrs. of Ore., Assn. of Profl. Engrs. of Prov. of B.C., Brooklyn Soc. of Engrs., Internat. Assn. of Navigation Congresses, N.Y. Good Rds. Assn., Municipal Art Soc., Nat. Organizing Com. of Freedom Internat., Soc. for the Preservation of Covered Bridges, Public Works Com. of N.Y. Soc. of Archts.; life fellow, Royal Soc. of Arts (England); fellow, Aerial League of Am., Am. Geog. Soc., A.A.A.S.; hon. mem. Société des Ingenieurs Professionels (France), Association pour le Development de l'Electroméchanique et de l'Electrométallurgie (France), Ohio Soc. Profl. Engrs., Tex Soc. Profl. Engrs., Ky. Soc. Profl. Engrs., Hudson Co. Soc. Profl. Engrs., Ida. Soc. Profl. Engrs. (life), Union County Chapt. of N.J. Soc. Profl. Engrs., Erie Co. (N.Y.) Chapt. Profl. Engrs., Archt. & Engrs. Alliance, Reg. Profl. Engr., N.Y., Ohio, Ia., Nebr., Me., Ill., Conn., Ore., W. Va., B.C., Que., and Ont. Clubs: Brooklyn Engrs. (pres. 1931-33, v.p. 1930-31, chmn. Meetings & Papers Com. 1929-31), N.Y. Chapt. Phi Beta Kappa (pres. 1933-34), Columbia Univ.; Phi Beta Kappa Associates (life mem.), "Ends of the Earth." Engrs. (New York), Millions Club of Sydney, Australia (hon. mem.), Nat. Travel Club; Chi Epsilon (nat. hon. mem. 1950), Columbia Univ. Chapt. of Sigma Xi (elected 1951), Tau Beta Pi (hon. mem.), Sigma Alpha (hon. mem.). Mem. Nat. Council, Nat. Econ. League 1933-40; Nat. Pub. Housing Conf. Exec. Com.; Bus. Men's Group, N.Y. Soc. for Ethical Culture 1925-27; pres., chmn. Bd. of Tr., Madison House Settlement 1926-27; mem. Assoc. Alumni, C.C.N.Y. (v.p. 1930-31, 1949-50, dir. 1929-36, 1947-49); hon. mem. Tech. Alumni, C.C.N.Y.; mem. Engrs. Council of the City Coll. Alumni (founder & dir.); mem. Cooper Union Alumni Assn.; mem. Nat. Com. for Columbia Univ. School of Engrg.; mem. Columbia Associates, Columbia Univ.; hon. mem. Internatl. Faculty, Univ. of Andhra (India); fellow, Research Council, Emerson Univ.; mem. Colegio de Ingenieros de P.R.; hon. v.p. and mem. Advis. Com., Laymen's Nat. Comm. Maj., Corps of Engrs., N.Y. State Guard; hon. mem., Internat. Inst. Am. Ideals; hon. mem., French Folklore Soc.; life mem., Soc. des Amis d'André-Marie Ampère (Fr.); charter mem., The Patrons of Rensselaer; mem. N.Y. State Assoc. Architects.

X-TG140
S8

LITERARY CALENDAR

POETRY
And
PROSE

D. B. STEINMAN

EILEEN

She is like a timid fawn
Startled by a leprechaun;
Lithe and poised for instant flight,
Standing at the edge of night,
Where the forest meets the dawn.

She lifts her head and sniffs the air
But finds no danger lurking there;
No evil hidden in the dark,
No cruel shaft to find its mark,
For who would harm a thing so fair.

X-TG140
.S8

The Cooper Union *February-March* 1959

ALUMNI NEWS

Bridges unite science and art

D. B. Steinman
Consulting Engineer

The natural world offers mankind a variety of things of beauty, but it offers no greater reward than the beauty man creates out of the resources or materials of nature, whether they be a statue, a building, or a bridge. In my own life, the bridge with its curves, arcs, and angles, as it fights gravity and clings to the sky, is the living symbol of man's struggle for growth, for conquest, for expression.

Each man takes a symbol out of his experience or makes his own concept of an ideal out of his daily task. The excavator sees a symbol of power and poetry in the snort of a bulldozer or the grinding teeth of a clam-shell bucket. The architect of a skyscraper has the same poetic glow of dedication to grandeur and splendor as the designer of a cathedral, and to both it can be spiritual and esthetic triumph.

I am a bridge builder and I am primarily concerned here with vocational esthetics as a device or agent of cultural rewards. I can admire the achievement of Roebling in the old Brooklyn Bridge, and the sense of adventure in his mind when he looked across the tidal sweep of the East River and visualized the web of steel that would support a path for commerce between Manhattan and Brooklyn. I speak with feeling here because it was my task in 1948 to help reconstruct the bridge to meet the demands of modern automotive commerce. Here was the first bridge to dare the drag of gravity using steel cables to carry the weight of the span and its traffic. This was a victory for the poetic mind in action.

Vocational esthetics can be applied to shipbuilding, from the wind-driven clipper ships of Donald McKay to the screw-driven transatlantic liners of William Francis Gibbs. Man, imitative and curious, has found esthetic excitement in his conquest of the air from the first paper design of Leonardo da Vinci to reality of flight by the Wright brothers at Kitty Hawk.

A beautiful building is a pleasurable experience for the eye, not alone in the success of its lines, or the materials used, but often in its variety of scenic moods against the dawn, the sunset, the moonlight, or even the snow squall. Buildings, boats, and bridges take on personalities, and even suggest individual temperaments. There was even talk of the demon-possessed bridge that crossed the Tacoma Narrows and, with mysterious warnings, whipped itself to destruction on November 7, 1940. Actually, it was an evil wind whose force and fickleness were underestimated that set up the violent contortions of the steel span in a dance of death. The whims of nature have to be considered in an esthetic approach to the combined utility and beauty of a bridge, boat, or building.

Cities have personalities that conjure up esthetic and cultural excitement but, when you analyze the sources of their individuality, these are often easily identified sources of the pleasure that is evoked. Any mental picture of London immediately brings up the Thames with its bridges and bustling river traffic. San Francisco, blessed with a natural setting of beauty, unveils its Golden Gate Bridge almost daily from the fog that rolls in from the sea. Manhattan combines architectural grandeur and splendor with its spiked horizons and river rhythms of skyscrapers and bridges.

Occasionally, an esthetic-minded public can change official decisions. In the design of the George Washington Bridge, the strong esthetic appeal is due largely to the natural grace and simplicity of the suspension type — expressed by two high and sturdy towers and the natural parabolic arcs of the great cables from which the slender floor system is suspended. The striking beauty of the steel towers was not planned. They were designed merely as load-carrying skeletons to be subsequently encased in concrete and masonry. The authorities gladly yielded to the public when it demanded that no false facing be added.

The late Arnold W. Brunner, archi-

The Long-Islander.

d Walt Whitman

ʼ AMERICA'S POET
and William White

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1 July, 1855.
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Emerson Early Champion of 'Leaves of Grass'

One of the most important literary relationships in American history is that between Walt Whitman and Ralph Waldo Emerson.

After Whitman had published his first edition of "Leaves of Grass" in July 1855, he sent a number of copies to relatives, friends, well-known people, and reviewers. Few paid any attention to it at all.

Emerson, however, not only paid attention to the book, he impulsively wrote Whitman that "Leaves of Grass" was "the most extraordinary piece of wit and wisdom that America has yet contributed."

And the young author was so moved by the glowing tribute from the greatest name in American letters of his day that he used a quotation from the letter, "I greet you at the beginning of a great career," in gold on the spine of the next (1856) edition of "Leaves of Grass."

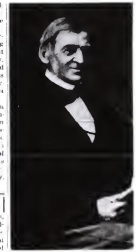
Gay Wilson Allen says in "The Solitary Singer" (New York, 1955, page 152) that Whitman "carried this remarkable letter around in his pocket all summer. With such an endorsement, from so eminent a man of letters, he was thus armored against the most brutal of slaughts of the critics."

(Whitman had the letter set in type, and a reproduction is seen on the right, being here used in a much later article on himself which he wrote for Lippincott's Magazine.)

Many of the ideas of Whitman were anticipated by Emerson; this was recognized in the first review of "Leaves of Grass" by Charles A. Dana in the New York Tribune, July 23, 1855. Whitman himself admitted the indebtedness to Emerson, claiming a year later that he was Emerson's true disciple.

As Whitman told J. T. Trowbridge, Italian opera and reading Emerson had been the greatest influences on his mind and poetry. Emerson had helped him "find himself," and said Walt, "I was simmering, simmering, simmering. Emerson brought me to a boil."

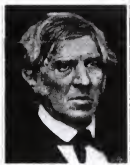
The relations between Whitman and the man he called Master continued until Emerson's death in 1882. They met, talked, corresponded, despite certain strains. Emerson tried to talk Whitman out of publishing "Children of Adam" poems, and Whitman was hurt when none of his poems were included in Emerson's anthology, "Parnassus" in 1872.



RALPH WALDO EMERSON

Whitman in 1855

This picture of Walt Whitman appeared as a frontispiece in the first edition of "Leaves of Grass". No author's name was on the title-page, and no name appeared under the picture. On the back of this copy, from the Feinberg Collection, is the notation in the poet's hand: "Walt Whitman—born May, 1819/this picture taken July 1855." He was slightly inaccurate, for the picture was printed in the edition published near the first of July, hence it must have been taken earlier than July.



Whitman: 1959

Where does Walt Whitman stand in 1959?

More than 140 years after the poet's birth, 104 years after the publication of "Leaves of Grass," and 67 years after his death, what is his reputation?

Arriving at a certain answer is difficult, if not impossible. But a few facts can be pointed out. There have been numerous societies and groups named after him; they perform both a social function and serve to perpetuate Whitman's name and work. A few still exist, one in Chicago being 53 years old.

His birthplace on Long Island and his longtime home in Camden have become shrines for his admirers, souvenir-hunters, and the curious. Public schools in many parts of the country have been named after him, as have at least one bridge and one hotel (both in Camden, N. J.).

More than 50 books have been written about Whitman as a man, poet, philosopher, seer, journalist, author, democratic ideal, and American. At least half a dozen were published in 1955, the centennial year of "Leaves of Grass." Over 200 exhibitions in honor of his work were held both in this country and abroad, the largest at the Library of Congress.

More than 100 articles are written every year about his poetry and prose, and two periodicals, the Walt Whitman Birthplace Bulletin and the Walt Whitman Review, are published quarterly, with material limited to the man and his writings.

American literature cannot be studied without reference to Whitman if not considerable attention being paid to his work. Graduate seminars in many of America's leading universities are devoted solely to the study of "Leaves of Grass" and other material.

A number of Walt Whitman collections, in institutional as well as private hands, pay high prices at auction and other sales for his books, letters, manuscripts, and other items.

Scholars and others interested in American life and letters in this country, Japan, France, Italy — all over the world — have become Whitman "specialists," spending much time and effort in the study of his verse and essays, his mind, his influence, and every facet of the man. He ranks with Herman Melville, Henry James, Mark Twain and Emily Dickinson as the most studied American author.

And the very publication of this page in the newspaper he founded in 1838 is further evidence of the place Walt Whitman has found in the hearts of fellow Americans and fellow men.

NYU Press To Publish W. W. 'Writings'

The New York University Press has announced the publication of a comprehensive edition of "The Writings of Walt Whitman," to be at least ten volumes, with the first unit tentatively appearing in 1960.

Whitman's Letters, edited by Edwin H. Miller of Simmons College, Boston, may appear next year in the first of five or six volumes. A variorum edition of "Leaves of Grass," giving all the variations over the many years of publication, is being prepared by Harold W. Blodgett of Union College, Schenectady, and Sculley Bradley of the University of Pennsylvania.

Floyd Stovall of the University of Virginia is working on "Specimen Days" and other major prose writings. Herbert Bergman, Michigan State University, is editing Whitman's newspaper and magazine writings — his journalism, apart from the major pieces. Thomas Brasher, Southwest Texas State College, San Marcos, has been assigned to collect Whitman's one novel and his many short stories and sketches of a fictional nature.

William White of Wayne State University and Edward F. Grier of the University of Kansas are editing the several notebooks, diaries, journals and commonplace books which Whitman kept during his lifetime. Never published, they are scattered in public and private collections. William White is also preparing a full-length bibliography of Whitman.

Gay Wilson Allen of N. Y. U. is managing editor of the entire project, and Sculley Bradley will take over as editor when the

Whitman's Life: A Chronology

By FLOYD STOVALL
UNIVERSITY OF VIRGINIA

1819. Walt Whitman is born May 31, at West Hills, Long Island.
1823. The family moves to Brooklyn in May.
1830. Whitman secures his first job as office boy for a lawyer named Clarke.
1831-32. Works as printer's devil in the office of the Long Island Patriot and the Long Island Star.
1833-36. Probably works in printing and newspaper offices in Brooklyn and New York, though no definite information on this period is available.
1836-38. Teaches school in the country.
1838-39. Establishes The Long Islander, a newspaper in Huntington, Long Island.
1839-41. Teaches school and works part time as a compositor and contributor for the Long Island Democrat, at Jamaica, Long Island.
1842-44. Successfully edits the Aurora, the Tattler, the Statesman, and the Democrat, all of New York City.
1868. Rossetti's selected "Poems of Walt Whitman" published in England.
1871. Fifth regular edition of "Leaves of Grass." Publication of "Democratic Vistas."
1872. Reads "As a Strong Bird on Pinions Free" (later entitled "Thou Mother with Thy Equal Brood") as the commencement poem at Dartmouth College in June.
1873. Is partially paralyzed on January 23. On May 23 he is present at the death of his beloved mother in the home of George Whitman, in Camden, New Jersey. Remains in Camden to live with George.
1875-76. Publication of "Memoranda During the War".
1876. Author's Edition of Whitman's works, in two columns, "Leaves of Grass" and "Two Rivulets." In the summer of this year he spends several weeks at the Stafford Farm on Timber Creek, a few miles from Camden, where his health is much improved. He continues to return there every summer for several

NEWS OF MICHIGAN

X.TG .S8 #217

SIXTH ANNUAL MICHIGAN WEEK — MAY 17-23

MAY 1959

...dors Seek New For Michigan

— Michigan, led by nearly 300 "Industrial ...narch, ...oup of outstanding business, industrial and ...out the state, have launched an ambitious ... to the rest of the nation. ...ulate and promote the growth of Michigan's ...nomy.

Breakfast For 10,000

BATTLE CREEK, Mich. — The world's longest breakfast table will be one of the highlights of Battle Creek's centennial Celebration July 30-Aug. 2. More than 10,000 persons are expected to eat breakfast at the four-block long table. The breakfast, of course, will feature Battle Creek made cereals.

Guest Editorial

People LIVE In Michigan —And LOVE It

(Editors: The following editorial by Editor Carl M. Saunders of the Jackson (Mich.) Citizen-Patriot, who won a Pulitzer Prize for editorial writing in 1950, is designed for possible use as a "Guest Editorial" in your newspaper or as a background article for any editorials you may write on our state. Mr. Saunders wrote the editorial for use in his newspaper during Michigan Week May 17-23.

BY CARL M. SAUNDERS

Editor of The Jackson (Mich.) Citizen-Patriot and winner of the 1950 Pulitzer Prize for Editorial Writing.

What's the matter with Michigan?

Editors around the country have been firing scatter shot at the state. Maybe we'd better take a quick look at the highlights of the Michigan story.

A state is many things; but mostly it's what nature made it and the kind of people who inhabit it.

Men and women can live and work and play in any one of the 48 — soon to be 50 — states, but, when all the reports are in and the assets are totaled, the people who are Michigan lift their proud heads in the conviction that here they live and work and play with greater environmental recompense than anywhere else from the rolling Berkshires to the rugged Rockies.

They live better in Michigan not only because the state's living standard is among the highest, but because the things which make for good living are near at hand.

They produce better in Michigan — the percentage of the state's income derived from manufacturing is highest in the nation. The annual value of manufactured product per worker here is $8,693 compared with a national average of $7,470.

Industries prosper in Michigan, because here are innumerable advantages: service by 32 railroads with more than 6,500 miles of tracks in the state; navigation over the earth's greatest inland waterways through the St. Lawrence to all the world; one of the nation's finest highway systems, being constantly improved with no toll roads; scheduled airlines flying north, south, east and west. Add to this nearness to raw materials, abundant skilled labor and a closeby market in the great central region of the United States.

Yes, industries prosper in Michigan for yet another potent reason— the most abundant supply of fresh water available to any state. While the South, West and East are troubled as water supplies trickle toward shortages, Michigan not only is the most favored of all the lake states, it also has a seemingly inexhaustible source of underground water from the mighty Lake Superior subterranean stream.

Nor is Michigan lacking in natural resources other than water. Iron and copper from Upper Peninsula mines feed industry. A vast tonnage of salt is mined to season the menus of all America. Chemicals, gypsum and lime from beneath the surface of the earth supply the raw materials for some of the nation's greatest industries. Natural gas at the rate of nine billion cubic feet a year flows from 59 producing fields. These and other fields yield a continuing stream of millions of barrels of oil for Michigan's giant refineries.

The Great Lakes! Along the blue waters which lap the shores of Michigan on the East, West and North are the finest bathing beaches in all America. Atlantic City, Miami and California — their famed beaches cannot match the soft, fine, white sand which sifts through the toes of bathers from New Buffalo northward and eastward around the lakes.

These same Great Lakes temper the climate for those who claim Michigan as their home. Prevailing westerly winds are cooled through the summer months and their chill mitigated in winter.

Nor have you seen all of the Water Wonderland when your eyes scan the rolling combers which glisten in the sun of Huron, Michigan, Superior and Erie. The air passenger flying over Michigan looks down on more than 11,000 inland lakes and more than 36,000 miles of flowing streams.

Water Wonderland indeed!

Michigan has more roadside parks and public picnic sites than any other state and a state park system which is the envy of all. Thousands of acres of state-owned lands are administered for public use.

Here live a progressive people. Our universities and colleges attract more than 15,000 students from other states and nearly every nation in the free world. Our people are not reluctant to maintain their public schools at high level in all respects. Within recent weeks the people of dynamic Detroit voted to spend 60 million dollars to completely modernize the city's schools ...

Michigan Industry Spending Millions To Expand Facilities

Filler Facts

Michigan is the nation's No. 1 producer of gladioli for bulbs. As many as 120 million bulbs are produced annually.

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The apple blossom is Michigan's state flower.

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Hunters took nearly 100,000 deer during the 1958 season in Michigan.

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A huge illuminated cross near Ludington, Mich., marks the spot where Fr. Jacques Marquette, French missionary and explorer, died in 1675.

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Motor vehicles are not allowed on historic Mackinac Island, Mich. All travel is done by horse-drawn carriages and bicycles.

* * *

The U. S. Fish and Wildlife Service reports Michigan led the nation in hunting and fishing license sales in the 1957-58 fiscal year with 2,264,285 licenses issued.

* * *

Michigan State University's Kellogg Center is the largest laboratory for hotel, restaurant and institutional management students in the U.S.

* * *

The National Ski Hall of Fame and Ski Museum is located at Ishpeming, Mich., where the sport was introduced to America by Scandinavian immigrants in the 1880's.

* * *

The Grand Hotel on Mackinac Island, Mich., is the largest summer resort hotel in the world.

* * *

The "Big Three" automakers— Chrysler, Ford and General Motors—have spent more than $3.5 billion since 1950 for new plants or additions to their facilities in Michigan.

* * *

A U. S. Census Bureau survey shows Michigan ranks 31st from the top among all states in taxes when related to incomes.

* * *

The National Music Camp at Interlochen, Mich., is the largest art training center of its kind in the U.S.

* * *

Production of electrical energy more than doubled in Michigan between 1947 and 1957, increasing from 11,801 million kilowatt hours to 24,830 million hours.

* * *

Although Michigan is best known as the automobile capital of the world, 81 per cent of all types of industrial goods are represented in the state.

* * *

An estimated 5 million tons of copper has been mined in Michigan during the last 100 years. In normal smelting operations, only one pound of copper is recovered from a ton of rock.

* * *

Michigan ranks first in the U.S. in percentage of income do...

LANSING, Mich. — Michigan industry is spending hundreds of millions of dollars to prepare for an expected boom in the nation's economy during the 1960's.

At the same time, scores of new industries, including many from other states, are coming to Michigan or establishing branch plants here.

Industry in Michigan spent $110 million for expansion during 1958 to rank fourth among all states in industrial construction, the magazine Engineering News Record reported.

Note To The Nation's Editors

Our sincere thanks to the many editors across the nation who used material from the first issue of "News of MICHIGAN."

"News of MICHIGAN" is designed to better acquaint you and your readers with Michigan — its people, its recreational attractions and its advantages for industry, and its resources, culture, schools and products.

Your comments and suggestions on these "clip sheets" will be appreciated. Thank you.

Public Relations Board
Michigan Week Headquarters
110 Mason Bldg.
Lansing 26, Mich.

Although a recession year in Michigan, industrial expansion during 1958 represented a jump of nearly $30 million over the 1957 figure.

This year, Michigan industry is expected to approach the $200 million mark in new construction.

The largest expansion so far this year was announced by the Great Lakes Steel Corp. of Ecorse, a Division of the National Steel Corp., which will spend $100 million for a new mill.

Significant industrial expansions last year included a $20 million expansion by the Cadillac Division of General Motors, start of a $12 million expansion by the Upjohn Co. of Kalamazoo and a $5 million expansion of facilities by the Checker Cab Manufacturing Co. of Kalamazoo in connection with production of its new passenger car.

Other firms spending $1 million or more to enlarge their Michigan facilities include American Motors Corp., Bissell Carpet Sweeper Co., Brunswick-Balke-Collender Co., Burroughs Corp., Chevrolet, H. J. Heinz Co., Lear, Inc., McLouth Steel Co., Parke, Davis & Co., Heath Co., Dow Chemical Co., GM's Detroit Diesel Engineering Division, Blandin Paper Co., Buhr Machine Tool Co., Cleveland Cliffs Iron Co., and Bound Brook Oil-Less Bearing Co.

Brunswick opened a new school furniture plant in Kalamazoo last year and began construction this spring on a new multi-million dollar automatic pinsetter plant at Muskegon that will have an annual payroll of $14 million when it starts production next Jan. 1.

Brunswick chose Kalamazoo and Muskegon as sites for the new plants after considering locations in three nearby states.

American Motors spent more than a million dollars for expansion and modernization of its Grand Rapids plant after moving its washing machine division there from Illinois.

Employment at Electric Auto-Lite Co. plant in Bay City increased after it transferred certain operations from an Ohio plant while the same thing happened at Universal Electric Corp. plant at Owosso when it transferred its Colorado plant to the main plant.

Queen to See Locks

SAULT STE. MARIE, Mich. — Queen Elizabeth and Prince Philip will travel through the American Locks here during their visit to the U.S. and Canada this summer.

Officials said the royal yacht Britannia must use the American locks because it is too large to pass through the Canadian canal. The royal couple will visit neighboring Sault Ste. Marie, Ont., on July 8 while enroute from Chicago to Fort William on the Canadian side of Lake Superior.

Michigan Could Bathe All of Us

GRAND RAPIDS, Mich. — Using a slide rule, Manufacturing Executive Fred H. Baker came up with some interesting statistics on Michigan's unlimited supply of fresh water.

Baker said Michigan water could be used to fill a bathtub for every person in the world and the level of the state's 11,036 inland lakes wouldn't go down an inch.

In addition to its inland lakes and 36,350 miles of streams, Michigan is bordered by four of the five Great Lakes. Its 3,121-mile shoreline is the second longest in the U.S., surpassed only by Alaska's coastline.

No Michigan community is more than six miles from an inland lake or stream or more than 85 miles from one of the Great Lakes and Michigan has the greatest supply of fresh water of any area of similar size.

In The Clouds

ST. JOSEPH, Mich. — How high would five million automatic washers extend if they were stacked one on top of the other?

The answer: 3,367 miles. Officials of the St. Joseph Division of the Whirlpool Corp. came up with this statistic recently when the Division produced its five millionth automatic washer, Whirlpool Automatic washer No. 1 rolled off the ...

X. TC 110
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The MEETING HOUSE NEWS
of the
Flatbush - Tompkins Congregational Church
Dorchester Road and East 18th St., Brooklyn 26, N. Y.

April 1, 1959

Miracle Bridge at Mackinac

Miracle Bridge at Mackinac will be the title of the address which the Men's Club will hear on Monday, May 4, at 8:15 p.m. The guest speaker is the world famous bridge designer and engineer, Dr. David B. Steinman. His achievements include more than 400 bridges which touch harbors and rivers on every continent except Africa in 21 countries and the states from Rhode Island to Oregon. Dr. Steinman is not only a distinguished bridge engineer, but also a poet (with 150 published works), scientist, scholar, educator and lecturer (the recipient of 22 degrees, four of them earned) and foremost, a humanitarian, who stated "we must cling to honor, to moral courage, to humanitarian ideals, to all the sanctities of life — to defend them, for these are the things our Godless adversary would destroy."

The Mackinac Bridge, a dream since 1854, became a reality in November 1957, after three and a half years of construction. The magnificent structure links the peninsulas between St. Ignace and Mackinaw City. The project features a suspension bridge with center span of 3,800 feet, the second longest in the world. But the total length of this suspension bridge, including anchorages, is 8,614 feet, making it the longest suspension bridge in the world. It tops San Francisco's famed Golden Gate Bridge by 2,614 feet. The towers extend to a height of 552 feet above low water. The height of the towers above the water is equivalent to a forty-six story office building. A total of $99,800,000 worth of Mackinac Bridge revenue bonds was purchased by private investors all over the country to cover the cost of the structure. The Mackinac Bridge is unique in that it is designed to improve tourist traffic between famed vacation areas of Michigan's lower and upper peninsulas. The 900,000 plus vehicles, which annually in recent years have crossed the Straits of Mackinac on the ferries, is expected to double in the future. The new bridge reduces the crossing time from more than an hour to ten minutes in comfort and safety. Dr. Steinman's bridge has won six gold medals and the Proctor award for scientific research. This article is just a preview of the exciting evening in store for the men.

Friday Market

APRIL 1959

X. TG 140
. S 9

The Harp

Five stories high above a city street
He dwelt, a child with wonder in his eyes.
For him, through winter cold and summer heat,
The sunbeams danced and stars sang lullabies.

One day, as if on wings, a stranger came
And stood within the room, unheralded.
Gently he spoke, calling the boy by name:
'David, play on your harp!' he softly said.

How did the stranger guess the secret dream
That, day and night, within the child's heart burned?
Outside the window, in the sunset gleam,
Glittered the instrument for which he yearned:

A bridge! The cables strung across the bay,
The strands that hummed like harp-strings murmuring,
They whispered to the child, 'Some day . . . Some day . . .
'There is my harp, sir. I can hear it sing!'

PERSPECTIVE

Flung from the fingers of Omnipotence,
The shimmering clouds of stardust found their place
As whirling suns and planets, to commence
Their ordered orbits in the realms of space.

On one small orb amid these blazing stars,
A blinking biped—Man—at length appears.
His Eden-earth soon racked by greed and wars,
He finds the Light to overcome his fears.

Of all creation in this vast design,
He scans the whole and glimpses the divine.

FINAL CURTAIN

And now the play is drawing to an end;
It thrilled me while it lasted, though I knew
In time the final curtain must descend.

In bright illusion's spell the moments flew,
Almost forgotten, in the drama's sway,
The veil between the unreal and the true.

I want to thank the Author for the play,
Its laughter and its tears. I do not weep,
Though stage lights dim. Content I go my way.

Drawn by the tender call of home and sleep
I have a rendezvous with love to keep.

D. B. Steinman

New York

Watertown Daily Times

WATERTOWN, N. Y., MONDAY AFTERNOON, MARCH 23, 1959

X. TG 140
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S.L.U. ART FESTIVAL

The David B. Steinman Festival of the Arts at St. Lawrence university, a kind of five-day frenzy of activity that ended Sunday, brought northern New Yorkers a rich and varied program of offerings.

Everything was of high quality and some parts of the program, such as the performance of Handel's "Saul," are so rarely done anywhere as to be worthy of special commendation.

It may not be impertinent, however, to ask, "Why an art 'festival' at all? Ought we not to live with good pictures, good music, good literature, and criticism all the time? Why this burst of artistic activity once a year?'"

Certainly, the historical precedent is before us—what were those Athenian drama contests, if not art festivals? And in the current state of college mores, there seems no reason why the arts, like football, winter sports, spring, and everything else, should not have its special weekend. A festival serves, at the very least, to proclaim a university's interest in and devotion to the higher pursuits.

The second Steinman festival at St. Lawrence did that, of course, but the printing of the program would have been enough to proclaim the official intention. What was more important was the actuality which proved the program was more than a mere official declaration.

The university managed to bring forth an immense amount of talent from among its own students and faculty members—musicians, painters, actors—and showed excellent judgment in its selection of visiting artists—Poet William Jay Smith and Composer William Schuman, as well as the "Art Schools, U.S.A., 1958" exhibition of paintings.

Art is, after all, a drudgery and its only true reward is found in public approbation. St. Lawrence is to be commended also for having provided a showcase for the artists who were represented at the Steinman festival.

The five days were, indeed, a frenzy, both for the participants and for those who tried to attend all the events. But it was a pleasant frenzy, and one is quite willing to be frenetic in so entertaining a cause.

X. TG 140
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The American Bard

To France

What is your magic spell, O France,
To throb our pulses with romance?
You bring the gift of love and song,
The breath of spring for which we long;
The sunshine where soft winds caress
To stir our dreams of happiness.
With beauty shrined in life and art,
France, you have given the world a heart!

And what is your flame of sacred light
Inspiring hope in darkest night?
With Freedom's battleflags unfurled
Your hero sons have thrilled the world.
They gave their lives to shape your plan —
To build the Brotherhood of Man.
Your noble dream is now our goal —
France, you have given the world a soul!

New York — *David B. Steinman*

January, February, March, 1959

X. TC 140
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NEW RAILROAD BRIDGE IN PAKISTAN TO BE LONG-SPAN STEEL ARCH,

Designed by D. B. STEINMAN, Past President N.S.P.E.

The new railroad bridge over the Rohri Channel of the Indus River, near Sukkur in West Pakistan, will be the ninth longest steel arch in the world, according to plans and specifications that have just been completed by D. B. Steinman, Consulting Engineer, for the Government of Pakistan.

The new bridge will be a steel trussed arch having an 806-foot 9-inch span between end pins of bottom rib. The rise of the bottom rib is 180 feet and the distance between ribs at the crown is 24 feet, making the total height of structure 204 feet.

The bridge is designed to carry approximately E 55 loading on one broad-gauge (5'6") track. The floor of the bridge will be provided with a concrete deck, fifteen feet wide between curbs and centered on the track centerline, for use of Class 80 military vehicles in an emergency.

The new bridge is to be constructed 100 feet downstream from and will replace the seventy-year old Lansdowne Bridge for railway traffic. The latter will be converted to highway use after the arch has been completed.

The existing Lansdowne Bridge, completed in 1889 from plans by Sir A. M. Rendel, is a cantilever bridge, with a main span of 820 feet. It was originally designed as a combination highway and railway bridge, but was later converted to a railway and pedestrian bridge. At the present time, the bridge is restricted to the lightest locomotive and a speed of only 5 miles per hour.

Following is a list of the world's longest steel arches up to the present time. The Sukkur Arch will become ninth in the list upon its completion now scheduled for early in 1961.

	Name	Location	Span (Ft.)	Year
1.	Bayonne	Kill Van Kull, N. Y. C.	1652	1931
2.	Sydney Harbor	Australia	1650	1930
3.	Birchenough	S. Rhodesia	1080	1935
4.	Nagasaki-Sasebo	Kyushu Island, Japan	1042	1955
5.	Glen Canyon	Arizona	1028	1958
6.	Hell Gate	New York City	977½	1917
7.	Rainbow	Niagara Falls	950	1941
8.	Duisburg-Rheinhausen	Rhine River	838	1951
9.	Volta	Ganna	805	1956
10.	Henry Hudson	New York City	800	1936
11.	Inoura Narrows	Omura Bay, Japan	710	1955

X. 16 149
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Conquest

FEBRUARY 1959

IF I WERE GOD

By D. B. Steinman

"If I were God, this weary world would be
A heaven. My omnipotent decree
Would banish care and pain, and even death!"
So boast impatient men of little faith.

How blind these mortals are, to think they can
Improve upon creation's master plan!

In star-filled blueprint they see naught sublime,
Nor can they calibrate its scale of time.
Tears and thorns before the heights are won,
As shadows are long before the rising sun.

To hail the dawn, we first must know the night;
Only from darkness can we prize the light.

As spring is wombed beneath the winter's snow,
Who knows not grief knows not compassion's glow.
When summer dies in blaze of autumn gold,
Old leaves must fall before new buds unfold.

Only with dying can there be rebirth
And laughing children to refresh the earth.

X. TC 110
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The Lyric

SPRING, 1959

TRANSFIGURED CITY

Leaving the Western plains, we wing our way
Above the billowed cumulus that shrouds
The checkerboard below. At dusk of day
We glimpse our goal and swoop down through the clouds.

With catch of breath, we suddenly behold
A web of roadways strung with jeweled light,
Festoons of rubies, emeralds, and gold,
Like fabled Baghdad of enchanted night.

And in the glow the flashing gems impart
To domes of glass and steel, to tower and spire,
One feels the pulsing of a mighty heart:
This Queen of cities, robed in lambent fire.

GRAND DAUGHTER

Her bliss of infancy is gone:
Where formerly she reigned supreme,
A newborn brother holds the throne,
Her earlier sway a shattered dream.

Now there is question in her eyes,
A troubled look upon her face.
What tender years to realize
The tragedy of second place!

Quietly she reads her book,
But on the infant boy keeps musing.
She casts a furtive, searching look,
Half self-effacing, half accusing.

What recompense can one bestow
For such a loss, past all believing?
The crown no longer on her brow,
What balm can heal her young heart's grieving?

D. B. STEINMAN

X. TG 140
.S 8

MORAL ARMOR FOR THE ATOMIC AGE

An Engineer Discusses the Vital Roles Of Both Religion and Science for Today

X
.S 8

By D. B. STEINMAN

On August 6, 1945, when the report of an atomic blast over Hiroshima was flashed around the globe, civilization was shaken to its utmost foundations. Individual reactions varied, from "I am scared to death," to "Father, forgive them for they know not what they do." Men realized that, in one brief moment, the history of the world had been changed. For better or for worse, the story of mankind had entered a new and fateful chapter.

Mortal man stands frightened among the appalling forces he has summoned from the unknown. Beholding the nuclear conflagration, man feels himself a child playing with matches—and he grows afraid.

In the present world crisis, we can at least strive to avoid mad actions and pray to be delivered from blind accidents. Through enlightened public opinion we can prevent those who govern us from lapsing into carelessness.

Civilized man is feeling the strain. There is a weary feeling of having almost reached the ultimate in the Faustian bargain of man's mastery over nature; and of having glimpsed in atomic power more of mastery—and of death—than man is ready to face.

Perhaps the fear and the soul-searching it induces are hopeful signs. Many more people now sense the need of divine guidance, of a moral compass to steer by, if only because they realize that a single blundering act may prove fatal to our civilization, if not to the continuance of the race of man.

The realization grows upon us that the spiritual ideal has ceased to be a luxury and has become an absolute necessity. Today, in a literal sense never before so apparent, the moral law has become the law of survival.

In our struggle for the heart of man, we must renew the faith; gain again the flaming emotion of Pitt and Cromwell; of Washington, Lincoln, and the great founders of the Republic; of St. Paul and all the great Christian martyrs who died for their religious beliefs. We must fire political doctrine and spiritual ideals with ardent belief, for our own sake and for the decency of mankind.

Daily we pray, "Thy Kingdom come." Without a belief in the ultimate good, all we have held sacred becomes meaningless. There is no old world to go back to; a new one must be made, and there are tigers in the way. We must breed and nurture a robust vigor to resist the vicious assertion that a state is an autocratic entity with supreme rights; that it need have no morals or obligations, and that its members are creatures to do its soulless bidding regardless of their own instincts of human dignity and of kindliness.

We must cling to honor, to moral courage, to humanitarian ideals. There is a tendency to think of these things in far too small units of time. Many are in panic because we have not solved the problems of the Atomic Age in the brief span of ten years. All historic time is only a moment in the eternal plan. Mankind is barely emerging from the nursery. He stands bright-eyed with new knowledge of his past and, for the first time, with the power and will to mold his own future. We must educate our youth so that they will be strong to resist evil and to fight for the things that endure.

St. Thomas Aquinas once said that there are only three really important endeavors in life: To have faith in the right things, to hope for the right things, to love the right things in life.

Religion, art, and science, representing the everlasting search for the good, the true, and the beautiful constitute a trinity of human aspiration. All three are but different aspects of the same reality, of the same feeling for the sublime, rooted in the supreme mystery of being.

It has been pointed out that there is a common and unifying element — what we identify instinctively as the divine spark — in a Raphael Madonna, a Beethoven symphony, a discovery by Copernicus, Newton, or Einstein. In each instance, inspiration was drawn from some common reservoir of spiritual vitality. In each there were moments of flashing intuition that call to mind the burning bush that spoke unto Moses. The experience of sudden inner illumination beyond mere intelligence, the inner light known to mystics, martyrs, and poets, is not unknown to creative scientists and inventors.

Art and religion flow from the same fount of inspiration in the human soul. We need only to think of the Psalms and the Prophets, or supreme examples of religious music and painting, to see their intimate relationship. And foremost thinkers among scientists and theologians are coming to recognize that science and religion also are closely related. As the horizons of science advance, many of its great leaders become more humble, not less; more reverent, not less.

The more deeply we delve into the heart of nature, the more awestruck we stand in the face of ineluctable mysteries. As the frontiers of science advance, the scientist, the poet, and the religious man meet on common ground — the common ground of the ultimate, the infinite, the eternal.

The man who discovered that electricity and magnetism are related, Hans Christian Oersted, once said, "The universe is a manifestation of an infinite reason and the laws of nature are the thoughts of God."

From Pythagoras and Euclid to Newton and Einstein, the mathematicians and scientists voyage on enchanted seas to find new isles of wonder. In the microcosm of the atom and in the universal laws of celestial mechanics, they find the poetry of harmony and perfection. They unveil for man the simple and sublime unity of Creation. In the structure of the universe, they discover the divinest poetry — the grandeur of the infinite.

By godlike magic given to man, linking the infinitesimal to the infinite, the scientist penetrates the atom and he lassos the flying stars. And in the ordered beauty and unity of the cosmos, in its sublime and eternal design, he finds divinity.

The age-old conflict between science

The author has an international reputation as a bridge engineer and consultant and is the author of many books in his specialized field.

X.TC 110
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KINGS COUNTY
PROFESSIONAL ENGINEER
JANUARY, 1959

Dr. D. B. Steinman, the world famous bridge engineer who has endowed more than 30 educational institutions in an amount exceeding $400,000.00, numbers among his honors the Townsend Harris Medal, presented by the City College of New York to such other outstanding personalities as William Hallock Park, discoverer of Diphtheria antitoxin; Bernard M. Baruch, advisor to the U. S. Presidents; the late Senator Wagner; Supreme Court Justice Felix Frankfurter and Dr. Jonas Salk, discoverer of the Polio Vaccine.

Contractors and Engineers

magazine of modern construction

X. TC 140
. S 8

Pakistan bridge to be one of world's longest steel arch spans

A new railroad bridge over the Rohri Channel of the Indus River, near Sukkur in West Pakistan, will be one of the longest steel arches in the world. The bridge will be a steel trussed arch having an 806-foot 9-inch span between end pins of the bottom rib. The rise of the bottom rib is 180 feet, and the distance between ribs at the crown is 24 feet, for a total height of 204 feet.

The bridge is designed to carry approximately E 55 loading on one broad-gage 5-foot 6-inch track. It will have a concrete deck, 15 feet wide between curbs and centered on the track center line, for use of Class 80 military vehicles in case of an emergency.

D. B. Steinman of New York City is the consulting engineer for the government of Pakistan.

APRIL 1959

X. IG 140

Bridge to Link Canada and United States

An artist's drawing of the proposed $18,000,000 bridge across the St. Mary's River between the United States and Canada at Sault Ste. Marie, Mich. Below, the span across the American ship canal in detail. A similar structure will span the Canadian ship canal. According to preliminary estimates the structure as designed would take 18 months to build. Design standards are similar to those of the Bureau of Public Roads for U. S. interstate roads

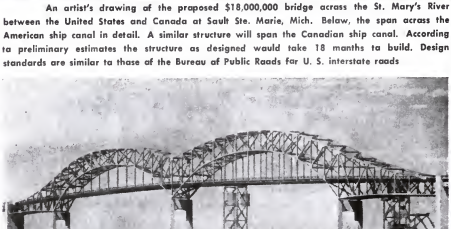
● FOR NEARLY 25 years a bridge connecting the United States and Canada at Sault Ste. Marie has been discussed. The International Bridge Authority was originally created by the Michigan legislature in 1935 to build a toll bridge. In 1941 a consulting engineering firm, hired to study costs of the project, recommended construction on a line 3 miles east of the city of Sault Ste. Marie.

Necessary federal legislation authorizing the authority to make a connection between the two countries was passed by the U. S. congress in 1940. In 1954 the Michigan legislature revised the original act creating the authority to better enable it to expedite financing of the bridge. In 1955 the Canadian parliament created the St. Mary's River Bridge Co. to provide a vehicular crossing of the St. Mary's River and later the rights and powers of the company were assigned to the International Bridge Authority, in an effort to better expedite financing and construction of the bridge. In 1956, engineering consultants conducted a traffic and revenue study of the bridge.

In the spring of 1958 John C. Mackie, Michigan state highway commissioner, met with the then Ontario Minister of Highways James N. Allan (he is now minister of the treasury) and both agreed their respective agencies should make every effort to assist in financing and constructing the project. The two highway departments requested D. B. Steinman, designer of the Mackinac Bridge, to report on design and engineering recommendations.

The bridges and approaches would be 12,000 ft. long, exclusive of toll plazas, providing two 14-ft. traffic lanes plus 2-ft. emergency walkways on both sides.

It would include an American plaza, about 1 mile west of the present ferry dock, located adjacent to Pine St. between Easterday and Ravine streets, swinging north from the plaza in a gentle "S" curve to the river spans for 4,145 ft. The river spans include two main structures across the American and Canadian ship canals and lesser spans over the United States power canal and the St. Mary's River rapids for a total length of 4,810 ft. The Canadian approach would be 3,045 ft. long, extending north and east from the Canadian ship canal in a gentle curve to the Canadian plaza located between Queen St. west and Albert St., extending from Hudson St. to Huron St., a distance of 660 ft.



The crossing will be located just east of the existing railroad bridge across the river.

The United States section would include two main spans, each 430 ft. long, with end spans 200 ft. long. There would be three spans on the Canadian side, one main span 430 ft. long (over the Canadian ship canal, allowing for its future expansion), plus two end spans 200 ft. long. Lesser spans would cross the power canal and the St. Mary's River rapids.

The design standards are similar to those required by the U. S. Bureau of Public Roads for bridges of this magnitude on the national interstate system, of which the bridge will be a part, with special attention given to provision of resistance to ice pressures on piers.

The bridge will include 67 piers and will effect a crossing through shallow water of a maximum depth of 20 ft., generally founded in sandstone rock. The cost of the bridge is estimated at $18,198,000, including $1,302,000 for right-of-way.

Operation and maintenance of the structure is estimated to cost $325,000. It would take 18 months to build the bridge. ■

X-TG140
S8

The Detroit Free Press

NOVEMBER 13, 1959

Big Mac Wins Beauty Award

About 100 persons turned out Thursday at a luncheon honoring a beauty contest winner, but the beauty wasn't there.

The guests weren't surprised, either, for the guest of honor was a bridge — the Mackinac Bridge, connecting link between Michigan's Upper and Lower Peninsula.

The 8,614-foot suspension bridge officially was named "America's Most Beautiful Bridge" at a luncheon in the Sheraton-Cadillac Hotel.

It was the winner in a contest sponsored by the American Institute of Steel Construction. There were 103 other entries.

The hundred-million-dollar structure was praised for "its strength, handsome silhouette and the beauty it gains from its noble proportions and mass."

FORMER SENATOR Prentiss M. Brown, Bridge Authority chairman, accepted the award.

Mervyn G. Gaskin, chairman of the AISC committee on awards, presented the stainless steel plaque.

He said that "The jury felt that designers are obviously taking a new responsibility for the beauty of bridges and their surroundings, and this year they had to choose from the many striking designs submitted."

The competition was for bridges opened during 1958.

The "Mighty Mac" was not the only prize winner from Michigan. The Tenth St. Bridge over the Black River at Port Huron received honorable mention in Class IV competition.

The Mackinac Bridge's Class I award was for bridges with spans of 400 feet or more. Mackinac has a five-mile

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THE BAY CITY TIMES

BAY CITY, MICHIGAN DECEMBER 31, 1959

'Big Mack' Again Stars in Book

This story of the man who designed the "Big Mack" across the Straits is good despite the laboriously light touch the author so patently strives for and so obviously fails of achieving.

David B. Steinman, the son of immigrant parents, was born in the shadow of the Brooklyn bridge in New York and never strayed far from bridge shadows for the rest of his life.

So far, he has built more than 400 bridges on five continents, and is even now at work on new spans in Pakistan and other foreign countries, as well as at an international bridge at the Michigan Soo.

• • •

THE PORTRAIT of a man whose intellectual brilliance approaches genius and whose character welds personal integrity to imaginative artistry comes through the pages at the adulating pen of the author, despite his frequent forays into the field of whimsical philosophizing.

Ratigan pours into the book a great deal of bridge history and engineering apologia, along with almost too much detail on chords and drusses and bracing and sfresses and stays and bents.

And he leaves little out of the life of Steinman, whose career is the stuff of Hollywood; brilliant student, exceptional teacher, creative genius, super salesman, designer without peer, artist in steel and poetic pen.

• • •

HERE IS A man dedicated to his profession, willing to sacrifice nothing to his goal of the perfect bridge, safe, enduring, a thing of beauty.

Michigan readers will perhaps find most interesting the two chapters devoted to "Big Mack," the Straits of Mackinac bridge that was Steinman's dream and the culmination of a long career in throwing his steel highways over broad waters across the world.

The book also discloses that the first design for the Straits bridge in the late 1930s would have ended in disaster for failure to compensate for the aerodynamic effects of strong winds.

• • •

MOTORISTS WILL also learn that the two open-grid inner lanes and central mall were designed not to save concrete, but to increase stability and prevent "Big Mack" from following the Tacoma Narrows bridge to disaster.

They will also discover that the "Big Mack" is failing to come up to its traffic estimates. The book says 2,023,000 vehicles were expected to cross in 1959 with revenues of $6,231,000. (The actual figures will be closer to 1,245,000 and $4,760,000.)

In summary, "Highways Over-Broad Waters" is basically readable and generally interesting. It is unfortunate that it should be marred by unnecessary ramblings and moralizings. —**Alfred L. Peloquin.**

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the transit

of Chi Epsilon

National Civil Engineering Honor Fraternity

Spring-Fall 1959

U.S. Engineers To Make History: First Bosporus Bridge Planned

Sometime between now and January, 1960, the Turkish Government will announce the opening of construction bids for a $50,000,000 suspension bridge across the Bosporus at Istanbul.

In so doing, it will translate a century-old dream into a concrete reality—the linking of the two continents of Europe and Asia. This will be the world's first intercontinental bridge and the longest bridge in the Eastern Hemisphere.

D. B. STEINMAN IS DESIGNER

Designer of the bridge is the well-known American engineer, D. B. Steinman, creator of such famous bridges as the recently completed Mackinac Straits Bridge in Michigan (longest in the world), New York's Henry Hudson Bridge, and the Thousand Islands Bridge across the St. Lawrence River.

DESIGN FEATURES

The suspension bridge will have a main span of 3091 feet and two side spans of 681 feet each. Two arched main towers, 520 feet each, will be supported on piers sunk to rock about 100 feet below water.

A system of wires and cable stays will radiate upwards from the ends of the trusses at each tower. Planned to provide maximum resistance to earthquakes, they will be arranged so as to emphasize and conform with the graceful curves of the main cable.

SPONSORED AND FINANCED BY THE TURKISH GOVERNMENT

Planning, financing and building of the Bosporus Bridge is under the supervision of Turkish General Directorate of Highways, and is considered to be one of the major projects in the current National Highways construction and modernization program. When completed, it will provide the connecting link for the modern highways now under construction which cross the country East from Ankara and other points to the Greek border.

SETTING CALLED "UNIQUELY BEAUTIFUL" BY ENGINEERS

Asked to comment on any unusual aspects of this latest Steinman bridge, a firm spokesman said: "its unique location, both historically and aesthetically."

Any one familiar with the history and geography of Turkey would agree. The Bosporus, a strait which connects the Black Sea with the Sea of Marmara and separates Turkey from itself as well as Europe from Asia, has always been of strategic importance, coveted by both conqueror and would-be conquerer of Turkey.

It is a favorite tourist attraction with its rock terrain and wooded shores, where palaces, villas and gardens extend to the water's edge. Rarely frozen over, the Bosporus despite its undertow, is a frequent bathing spot.

Architect's rendering of the proposed Bosporus Bridge.

READY FOR USE IN 1963

Now travelled only by ferries and boats, the Bosporus will soon service automobiles and trucks, all the appurtenances of modern transportation. In addition, a vertical underclearance of 164 feet for the central portion of the main span will be provided for international shipping.

According to Steinman, who will also supervise the construction of the bridge, it should be ready for use sometime in 1963.

TRIANGLE REVIEW

November, 1959

44th Convention Names S. C. Hollister To National Honorary Membership

Engineering educator SOLOMON CADY HOLLISTER CORNELL HONORARY, former Dean of the College of Engineering and Trustee of Cornell University, was elevated to National Honorary Member status at the concluding banquet session of the 44th annual convention, September 2-5.

The sixth man to receive this status —which is jealously guarded by Triangle and reserved for men of such outstanding eminence in the engineering profession as to merit national, if not international acclamation. Brother Hollister joins DAVID BARNARD STEINMAN, master mind behind the five-mile-long Mackinac Bridge; Lt. General JOHN R. HODGE, retired, former Chief of Army Field Forces and former military governor of Korea. Deceased National Honorary Members include: Dr. OVID WALLACE ESHBACH, former Dean of Northwestern University Technological Institute; DANIEL W. MEAD, famed authority on hydraulics and Professor Emeritus Hydraulic and Sanitary Engineering, University of Wisconsin; and ARTHUR N. TALBOT, famed authority on concrete and railroads, and Professor Emeritus in Municipal and Sanitary Engineering, University of Illinois.

Brother Hollister has been an honorary member of Cornell Chapter since the Chapter's initiation into the national organization in 1942.

Only a few of his accomplishments follow: Membership on numerous professional and public commissions includes the Manpower Commission of Engineers' Joint Council; the Committee on Specialized Personnel, Office of Defense Mobilization; Advisory Committee on Engineering Sciences for Selective Service; the Advisory Committee for the National Registry of Engineers and Scientists; and the Signal Corps Development and Research Council.

He is currently chairman of the Committee on the Survey of the Profession of Engineers' Joint Council—Engineers' Council for Professional Development. His association with various state and federal agencies extends over a period of many years, the most recent being his service on the Second Hoover Commission, and the current chairmanship of the Board of Consultants for Isthmian Canal Studies for the Committee of Merchant Marine and Fisheries of the House of Representatives. He has recently been appointed to the Steering Committee for the Study of Africa South of the Sahara.

Brother Hollister has accepted numerous assignments in the field of education, including service as chairman of the Education Committee of Engineers' Council for Professional Development, and on the ECFD Committees on Graduate Education and Adequacy and Standards. His long participation in the activities of the American Society for Engineering Education culminated in his being elected president in 1951-52. In 1952 he was awarded the Lamme Medal, bestowed annually upon a distinguished engineering educator. He holds honorary degrees from several universities.

"An Honor I Will Always Cherish . . ."

—Brother Hollister

In accepting National Honorary Membership, Dean Hollister said he knows the other living recipients—General Hodges and Dr. Steinman. "These are great men," he said, "to rank me with them is an honor I will always cherish."

X-TG140
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Three Dimensions of Man

DAVID BARNARD STEINMAN
Doctor of Fine Arts
Bethany College
1960

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Sheathed in Ice, Bridge Can Stand Winds of 632 mph

Mackinac Suspension Span 'Most Stable Ever Designed'

BY GREGG SMITH.
(Citizen Patriot Special Correspondent.)

St. Ignace — Wind tunnel tests have disclosed that the Mackinac straits bridge being constructed here will be the world's most aerodynamically stable bridge when it is completed.

The tests, conducted by Prof. F. B. Farquharson of the suspension bridge laboratory at the University of Washington, have disclosed that the bridge, under the most adverse circumstances (sheathed in sleet) will remain stable in wind speeds up to 632 miles per hour.

The figure should be a source of comfort to doubters of the bridge's stability. The highest wind ever recorded at the straits is 78 miles per hour.

Wind tunnel tests of the bridge, the world's longest single suspension span, were arranged for by Dr. D. B. Steinman, consulting engineer and designer of the bridge, March 18, 1954. And after exhaustive tests, the final report was made by Prof. Farquharson May 20, 1955.

OFFICIAL REPORT.

In an official report to the Mackinac bridge authority, after a review of the wind tunnel tests, Dr. Steinman stated, "Extensive wind tunnel tests show, as anticipated, that the Mackinac bridge, as designed, has complete and absolute aerodynamic oscillation (vertical, torsional, and coupled) at all wind velocities and all angles of attack."

In less scientific terminology, Dr. Steinman means that the bridge will not start a "Galloping Gertie" act as occurred when the Tacoma narrows bridge collapsed.

Dr. Steinman added, "Even for the hypothetical and abnormal condition were all openings in the deck are assumed to be completely closed by ice, the Mackinac bridge has complete and absolute aerodynamic stability against all modes of oscillation at all wind velocities up to a wind velocity of 632 miles per hour for the lowest mode of oscillations and 942 miles per hour for the next higher mode."

For comparative purposes, official bulletins of the University of Washington engineering experiment station list the critical wind velocities or other famous American bridges as follows: Bronx-Whitestone (after addition of stiffening trusses) 30 mph, Golden Gate, 40 mph.; George Washington, 55 mph; New Tacoma narrows, 76 mph.; Mackinac (with deck closed) 632 mph.; Mackinac (with deck open as designed) infinite.

DEVELOP THEORY.

For many years the designer of the Mackinac bridge had noted that suspension bridges had a tendency to sway and develop an undulating motion in winds of gale force. Pondering the probable cause of this phenomena, Dr. Steinman developed the theory that a span of a bridge was no different than the wing of an aeroplane. The greater the wind, the more vacuum was developed above its surface just like the vacuum that lifts a plane into the air when wind rushes over the surface of a wing.

To avert this effect, the designer reasoned that a bridge, to withstand winds, should be as open as possible so that winds could not create a lifting surface. To provide stiffening effect to the bridge, the ratio of the trusses supporting the span should be as deep a ratio to length as could be economically constructed.

Combining these requirements, Dr. Steinman developed a new concept in big bridge design which he termed the "aerodynamic stability of bridges."

Stiffening trusses on the Mackinac bridge will be 38 feet in depth, or one one hundredth of the span's length. This is the same ratio adopted after years of exhaustive aerodynamic tests for the proposed Severn bridge in England and 68 per cent greater than the ratio used in the Golden Gate bridge.

According to Dr. Steinman, this generously high depth-to-span ratio—will have more ample aerodynamic stability. By scientific design, utilizing all the new knowledge of suspension bridge aerodynamics, the Mackinac bridge has been made the most stable suspension bridge, aerodynomically, that has ever been designed, the designer claims.

DESIGN SAVES CASH.

Dr. Steinman adds, "This result has been achieved, not by spending millions of dollars to build up the structure in weight and stiffness to resist the effects, but by scientific design of the cross-section to eliminate the causes of instability."

And that's what Prof. Farquharson found out, too. Because models of the bridge had features of stability much higher than had ever been previously investigated, the wind tunnel test equipment used at the experiment station had to be revised, extensively. Some features of stability were too high to be fully duplicated in the model test and so the next improvement in the science of bridge will probably not be in bridges—but in wind tunnels to test them.

Jackson Citizen-Patriot
Michigan (Aug. 14, 1955)

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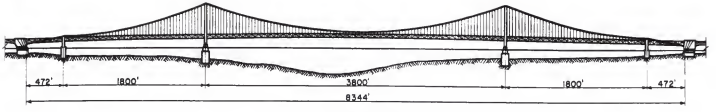
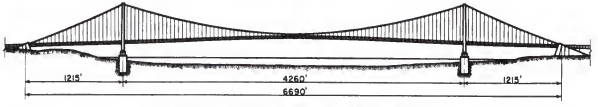
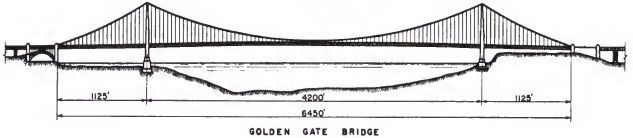


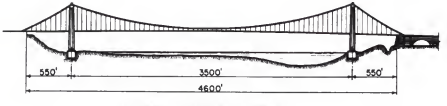
MACKINAC BRIDGE
COMPLETED 1957



VERRAZANO - NARROWS BRIDGE (UNDER CONSTRUCTION)
FOR COMPLETION IN 1964



GOLDEN GATE BRIDGE
COMPLETED 1937



GEORGE WASHINGTON BRIDGE
COMPLETED 1931

BROOKLYN BRIDGE
COMPLETED 1883

THE WORLD'S GREAT SUSPENSION BRIDGES
COMPARATIVE MAGNITUDE

X-TG140
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WITH BEAUTY LIKE A PSALM

(For Dr. David B. Steinman)

The needs of mankind are his deep concern:
Rivers to span -- broad lakes and swamps traverse;
All intricate dimensions he must learn
And deftly pattern, like a lyric verse;
His eager mind encompasses the world
Whose need is fellowship and human grace,
Hence, by his hand, deftly are hurled
Inviting spans that lead from place to place.
He holds so many lives within his palm,
Yet skill and conscience make him oversure
That he can build with beauty like a psalm
Imbuing strength that always will endure;
And though his feet cling firmly to the sod
His hand and spirit seem a part of God.

Jean Chalmers Donaldson

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The Golden Year

D. B. Steinman

BLUEPRINT

He saw it clearly and clairvoyant bright:
Twin granite pylons of majestic rise,
Founded on rock beneath the water swirl;

The lofty cables, spun of cold-drawn steel,
Cutting the sky in parabolic arcs—
A lyric pattern etched against the blue.

The spell of Euclid sang in his design:
The wizardry of radiating stays,
A geometric web to hold the stars;
The titan uplift of the singing strands;
High Gothic portals framed in stone—all these
He traced in blueprint, accurate as truth.

This magic he had made, though in the end
He did not live to see the caissons down.
The shadow of a fear that builders know
Was myth made real: 'A bridge demands a life.'
He paid the toll, the world his legatee:
His work, his dream, bridging the span of death.

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CIVIL ENGINEERING

Capacity of Golden Gate Bridge to Be Studied

A four-month study to determine the feasibility of running high-speed rapid transit vehicles across the Golden Gate Bridge will be conducted by D. B. Steinman, F. ASCE, New York City consulting engineer and bridge authority. A rapid transit route between San Francisco and Marin County is a key link in the five-county, 125-mile rapid transit system that has been proposed for the Bay area.

April 1960

STATE JOURNAL

LANSING—EAST LANSING, MICHIGAN, FEBRUARY 21, 1960

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The Bridge at Mackinac

When it opened Nov. 1, 1957, Michigan's breath-taking Mackinac bridge was hailed by Gov. G. Mennen Williams as "a modern Northwest Passage."

Indeed, the giant bridge has stimulated a greater flow of long-distance travel through Michigan to the Rocky Mountain and Pacific states and to the Canadian provinces.

But in far greater measure it has opened new avenues of commerce and tourist travel between upper and lower Michigan and between Michigan and its immediate neighbors in the north central region.

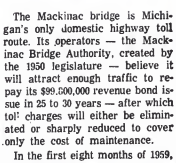
FOUR YEARS in the building and costing almost $100 million, the Mackinac bridge (pronounced Mack-in-aw) emerged in 1957 as one of the greatest of the man-made wonders of the world . . . an artistically impressive million-ton combination of steel and concrete linking the upper and lower peninsulas of Michigan.

Measured between its enormous cable anchorage blocks — each of them about a third of a football field in size — it is the world's longest suspension span — 8,614 feet.

Including its approaches, it is five miles long — 26,372 feet to be exact . . . and cuts what was once a minimum crossing time of one hour on the ferries between Mackinaw City and St. Ignace to 10 minutes.

During its first 12 months of operation, the four-lane structure carried 1,411,500 vehicles — 54 per cent more traffic than the ferries transported across the Straits of Mackinac the year before.

ITS ERECTION fulfilled a century - old dream of northern Michigan travelers for a bridge across the turbulent straits.



The Mackinac bridge is Michigan's only domestic highway toll route. Its operators — the Mackinac Bridge Authority, created by the 1950 legislature — believe it will attract enough traffic to repay its $99,500,000 revenue bond issue in 25 to 30 years — after which toll charges will either be eliminated or sharply reduced to cover only the cost of maintenance.

In the first eight months of 1959, the bridge drew 30 per cent more trucks and other commercial vehicles than in the same period the year before — indicative of the stimulating effect the span is having on the state's commercial development.

The story of the Mackinac bridge is told only in the superlatives matching the relentless determination of generations of Michigan people to unite their two great peninsulas no matter what the financial cost nor the engineering difficulty.

Its ivory - colored suspension towers — standing 552 feet above water, higher than the Penobscot building in Detroit, Michigan's tallest skyscraper . . . are 3,800 feet apart, astride a gorge in the straits 295 feet deep.

While the central span between the towers is slightly shorter than that of the Golden Gate bridge, Mackinac's 8,614 feet between the massive concrete cable anchorages make it the world's longest suspension bridge.

From their rock foundations to their tip, the cable towers are 762 feet high — and each contains 6,500 tons of steel. Above water they rise as high as a 46-story office building — and almost as high as the 555-foot Washington Monument.

Leading to the suspension span itself are 28 truss spans, ranging in length from 160 to 560 feet — making a total expanse of 19,243 feet (more than 3½ miles) of steel superstructure.

THE BRIDGE arches gracefully over the straits, allowing 155 feet of clearance at midspan for the largest ships to pass safely beneath. At that point, the roadway of the span is 199 feet above water.

The two suspension cables — 68 feet apart — are more than two feet in diameter (24½ inches), fabricated of 42,000 miles of wire, . . . enough to reach one and two-thirds times around the equator. The cables weigh 11,840 tons.

Weight of the superstructure is 66,500 tons . . . and of the foundations and superstructure together, 1,024,500 tons.

The concrete blocks in which the suspension cables are anchored are each 135 feet long and capable of resisting 30,000 tons of pull from the two cables which support the main span.

Each of the anchorage blocks contains more than 85,000 cubic yards of concrete — enough to build 26 miles of two-lane pavement. More than 466,300 cubic yards of concrete went into the entire structure, for a total of 934,000 tons of concrete.

The four-lane bridge has a 48-foot-wide roadway, with opposing traffic separated by a raised center mall two feet wide. At the permitted speed of 45 miles an hour it is capable of handling 3,0 cars an hour — and if used capacity could accommodate i one week the volume of traff carried during an entire year the ferry fleet which the bridg replaced.

The bridge is designed to wit stand wind velocity of 632 mil an hour — far more than h ever been recorded at Mackina . . . and is engineered to resi ice pressures greatly in excess anything known or considered po sible at the straits. Some 85,0 blueprints and 4,000 engineeri drawings were used in its co struction, guiding the work of t 10,350 men employed on the pr ect at the bridge site and in t quarries, shops, mills and oth supply points.

THE 10-MINUTE bridge cro ing brings Michigan's two pen sulas about 150 miles closer gether in driving time — for, wh ferries were in use, it was custo ary to have to wait a considera time for a crossing. At times d ing the deer hunting season, tr fic waiting to board the ferr was lined up for 17 miles.

Despite the immensity of t job, construction proceeded schedule during the four-ye building period, and the brid was opened to traffic Nov. 1, 19 the date announced before t project started. It was forma dedicated in elaborate ceremoni June 25 - 28, 1958.

Its designer and chief engine Dr. David B. Steinman, says Mackinac bridge should rem serviceable for at least a centu

In 1959 the American Institute Steel Construction designated t structure as "America's m o beautiful bridge."

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New York Construction News

NEW YORK - NEW JERSEY METROPOLITAN AREA

April 25, 1960

54 Bridges In Steinman Contract

The State of Connecticut has retained D. B. Steinman, Consulting Engineer, for the survey and design of an eight-mile stretch of new express-highway through Cheshire, Southington and Meriden. The contract requires a total of 54 bridges, including eight stream crossings, 42 grade-separation structures, and four pedestrian overpasses.

IN THE TOWN of Meriden, the route winds through the hills of Hubbard Park, where a wide median of variable width will permit each roadway to follow the contours without marring the beauty of the park. Structures in this area will be given special architectural treatment to harmonize with the surroundings.

The plans call for a limited-access, four-lane divided highway with provision for future widening to six lanes.

Newsletter to **PARENTS**

ST. LAWRENCE UNIVERSITY

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April 1960

STEINMAN FESTIVAL AWARDS

Student achievement in the creative arts was cited during the third annual David B. Steinman Festival of Arts, March 8–16.

Awards were made to the following students: The David B. Steinman Prize in Creative Arts —Joyce Muller, Westfield, N. J.; Frederic Remington Prize in Fine Arts—Vagn Worm de Geldern, New York City; David B. Steinman Festival Purchase Prize in Art—Peter Dygert, Rochester; Paul L. Wolf Memorial Prize in English—joint award to Bruce and Robin McNallie, Buffalo; Alexander Black Memorial Award for Contributions to College Journalism—John Simpkinson, Cincinnati, Ohio, and Celiene Nold, Rome; and the Hill News Editorial Board Award—Carol Kemp, Dravosburg, Pa.

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SIGNPOST

April 1960

CHILD IN A CARPENTER SHOP

by David B. Steinman

Learning the tools
Of his father's trade,
He nailed one lath across another
Then silently brought it to his mother.
With trembling sense
Of future loss,
She saw the sign
The child had made.
It was a cross.

This poem, which tells a familiar Easter story in simple, poignant terms, is the work of Dr. David B. Steinman, one of the foremost builders of bridges in the world today. He recently completed the great bridge across the Mackinack Strait and is now at work on the Indus River Bridge in Pakistan. When completed in 1961, this will be the longest railroad arch span in Asia and the third longest in the world.

Dr. Steinman sees bridges not only as structures of iron and steel to enable pedestrians, motorists and railroads to cross rivers and bays, but also as monuments of beauty and romance. In his desire to express what he really feels about his bridges, he turned to poetry. So successful has he been that he has won many prizes. This particular poem won first prize from the Wisconsin Poetry Magazine and is reprinted with Dr. Steinman's permission.